Modern Metals

MAY, 1961

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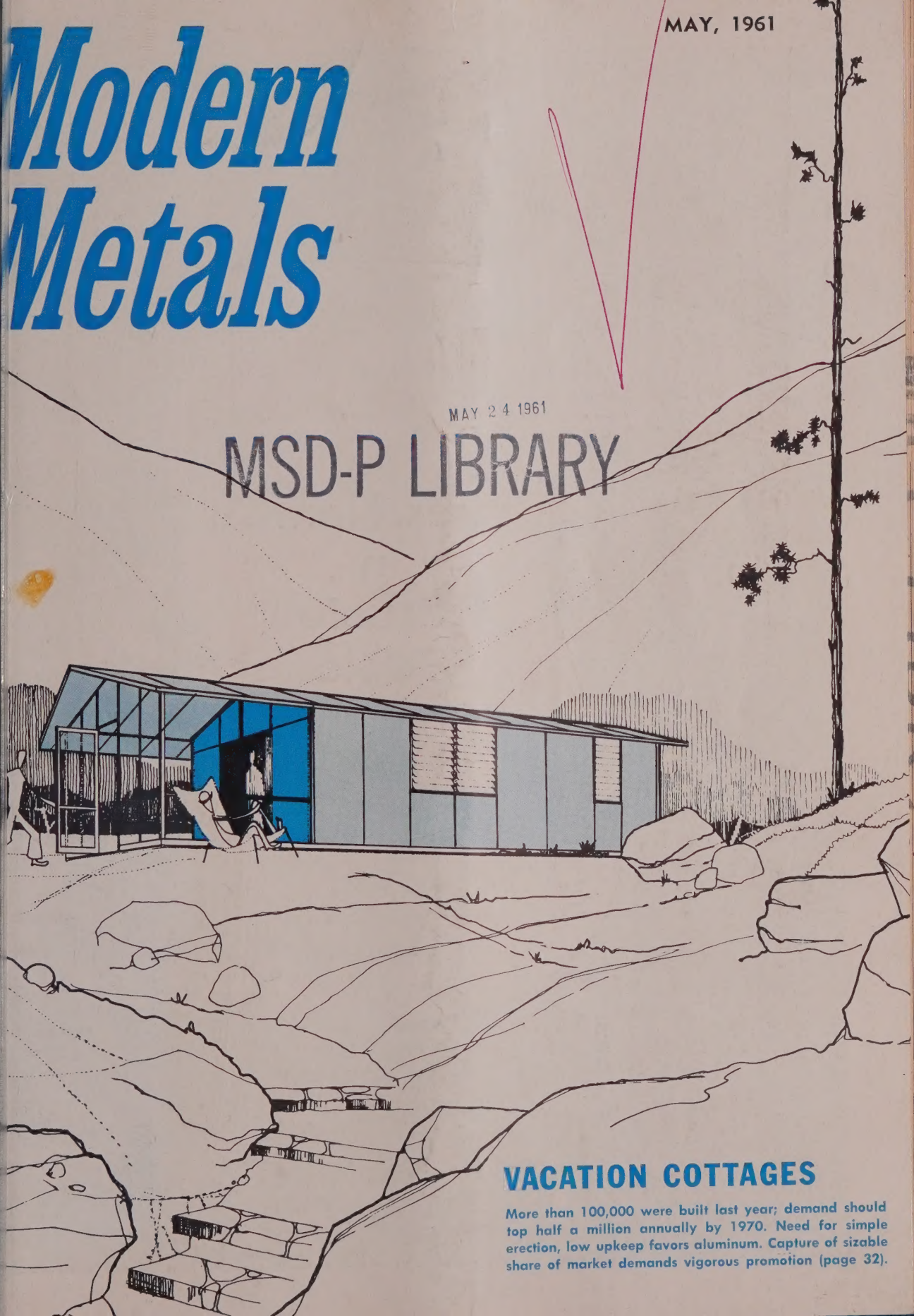

VACATION COTTAGES

More than 100,000 were built last year; demand should top half a million annually by 1970. Need for simple erection, low upkeep favors aluminum. Capture of sizable share of market demands vigorous promotion (page 32).

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Any fabricator who has made Scovill a part of his competitive team knows that these are only a few examples of the down-to-earth help and service he can depend upon. Call in Scovill NOW . . . especially if you want to get ideas and help in selection of the BEST metal for an important new product.

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45

How to select the right aluminum alloy for screw machining

Suitable Aluminum Alloys: Since aluminum can be cut at exceptionally high speeds and feeds, a high production rate is assured. The principal alloys used in automatic screw machines are 2011-T3, 2017-T4, 2024-T4, and 6061-T6.

2011-T3 Of these, 2011-T3 is considered superior. It has lead and bismuth added to speed machining, improve the finish of the machined part, and create a finely divided chip. This alloy is specifically recommended for a broad range of screw machine products.

2017-T4 Alloy 2017-T4 offers greater corrosion resistance and ductility than 2011-T3 and is often suggested for parts which require forming operations after machining. It is selected frequently for hydraulic pistons and products requiring deep drilled holes.

2024-T4 The 2024-T4 alloy has higher mechanical properties than 2011-T3 or 2017-T4 and is widely used for aircraft fittings. Because of its relatively high shear strength, many electronic instrument parts and threaded fasteners are made from it.

6061-T6 Although 6061-T6 has somewhat lesser mechanical properties and a lower machinability rating than the foregoing alloys, it has superior corrosion resistance and is more suitable for brazing, soldering and fusion welding. This alloy also gives a better finish when anodized. Tools for machining 6061-T6 require larger rake angles since the chips are less brittle and have a tendency to build up on the cutting edge. The higher strength aluminum such as 5056, in the cold work tempers, offers good machinability. It is comparable to that of 6061-T6. The softer alloys such as 5052 and 3003, offer improved ductility and excellent corrosion resistance, but they are not as free-cutting as the harder alloys. The application of relatively larger rake angles usually provides for good machinability. To induce favorable chip formation, chip breakers or chip curlers are recommended for the cutting tool.

SPEEDS AND FEEDS

High surface speeds (700 sfpm) may be used in turning round stock. Hexagonal or square stock should be turned at lower speeds (450 and 300 sfpm, respectively). Feeds used will depend on depth of cut, tolerances, and finish required. In general, feeds start at 0.006″ for a 1/16″ depth of cut to finished size of 1/16″ to 1/8″, and range up to 0.015″ for a 1/32″ depth of cut to a finished size of 1/4″ or more.

COSTS

Keep in mind that aluminum must be compared on the basis of price per piece instead of price per pound when figuring material costs. Remember a pound of aluminum will yield three times as many pieces as a pound of most other metals.

CUTTING TOOL LUBRICANTS

The high rate of metal removal when automatic screw machining aluminum makes it desirable to use a high volume of low viscosity cutting fluid or lubricant under low pressure, carefully directed to hit the tool and work to carry away as much heat as possible. Lighter oils flow over the work more readily and thus can be expected to remove heat faster.

Mineral oils with a viscosity of not more than 100 seconds Saybolt Universal (at 100°F) are recommended. Water soluble oils also work well on machines where seepage of the lubricating oils can be controlled. Soluble oils have the advantage of removing heat faster than usual mineral oils.

For exacting jobs, use oils especially designed for work with aluminum. They usually consist of a light mineral oil with 5-10 percent of fatty additions (such as oleic acid, lard oil, or neatsfoot oil) with a viscosity of 45-65 seconds Saybolt Universal at 100°F.

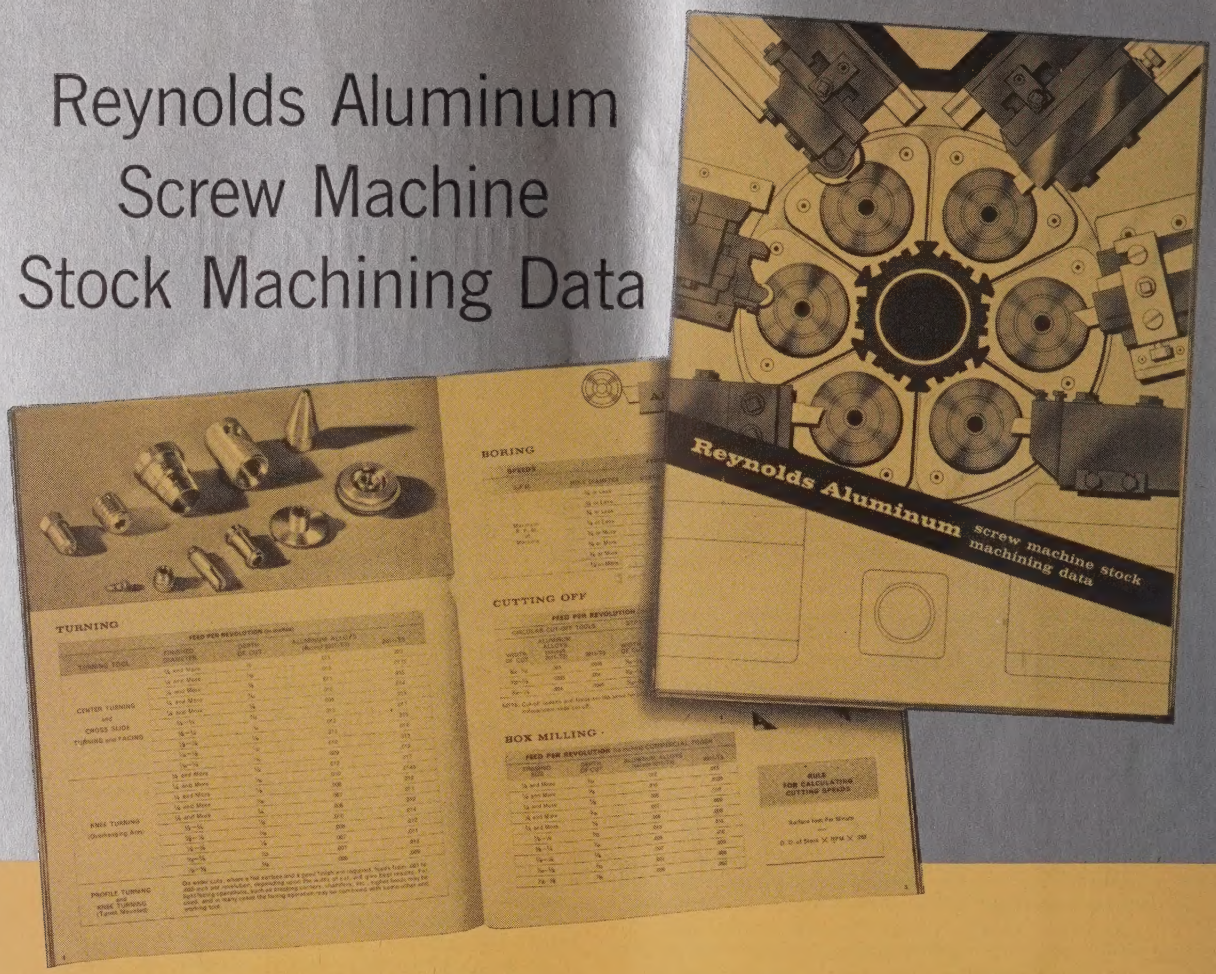
All aluminum alloys have good machinability but in the interest of efficiency it is desirable to design tools and specify cutting conditions tailored to each alloy.

Note: Other tempers in above mentioned alloys available for screw machine stock: 2011-T8, 2017-T451, 2024-T351, 6061-T6

And, to be sure you get the right aluminum—use Reynolds Aluminum

FREE booklet on Reynolds Aluminum Screw Machine Stock Machining Data—see next page. →

Reynolds Aluminum Screw Machine Stock Machining Data



Add to your Technical Library with this new informative booklet

This fact-packed 12-page booklet details the proper speeds and feeds for turning, forming, threading, cutting and knurling—plus tables, charts and illustrations. Invaluable for the engineer and metal worker.

For complete information, answers to your questions on aluminum, and the "Aluminum Screw Machine Stock Machining Data" booklet, contact your nearby Reynolds Distributor or write to the *Reynolds Metals Company, Box 2346-KL, Richmond 18, Virginia.*

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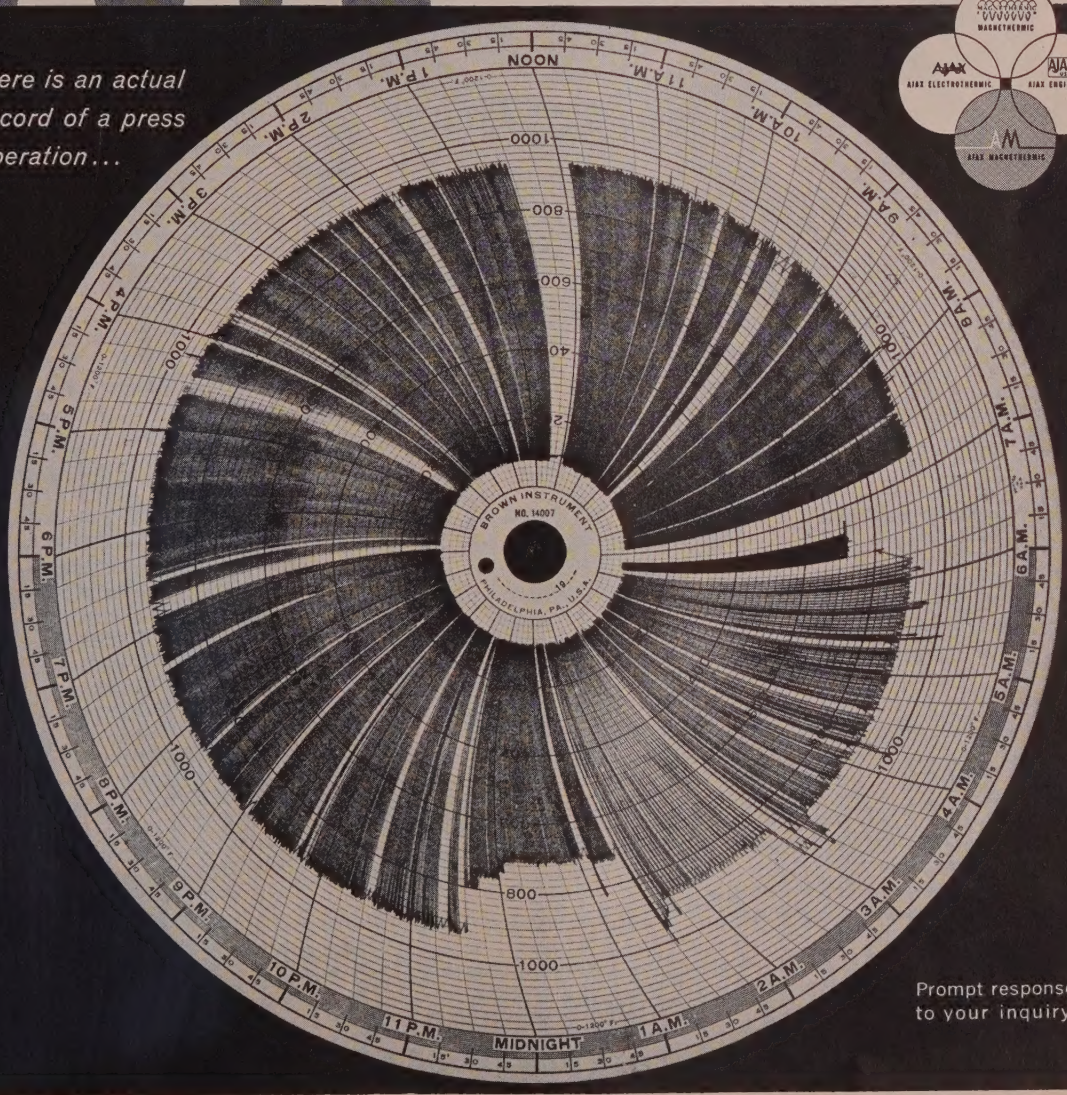
*Here is an actual record of a press operation...



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MODERN METALS
Read in companies that produce, fabricate and cast aluminum, magnesium and titanium, and firms that use these metals in manufacturing end products.

THE COVER: Perched serenely in its te (if hypothetical) mountain retreat neat, comfortable aluminum cottage. ite narrow, winding mountain roads, abin was reasonably easy to transport ıe site because of its aluminum con- tion. It was also fairly easy to erect ıse it is made primarily of modular ls that are fitted together in "erector manner. This particular cottage is thetical (artwork courtesy of Panelfab ucts, Inc.) but the market is real. And ll take increasing quantities of alumi- from now on — as detailed in the le starting on page 32.

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Modern Metals

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VACATION COTTAGES ..... K. B. Rhodie **32**

A new wrinkle in the building field is the vacation cottage or "second home." Pioneering developments so far indicate that aluminum and plastics are prime materials for this field because of adaptability to prefabrication; opens huge market for extrusions, pre-coated sheet, fasteners, etc.

COATING LINE PRIMES, PAINTS, EMBOSSES **43**

Hunter Engineering's new finishing line applies epoxy primer to one or both sides of aluminum strip before finish coating; can also emboss it before re-coiling.

DIE CASTING MAGNESIUM ..... S. L. Strong **48**

Substantial changes in equipment, techniques have been made since the A-C Spark Plug division of General Motors began magnesium die casting operations in early 1950's, according to paper given at Magnesium Association meeting.

Rx FOR AILING EXTRUDERS ..... R. G. Welch **56**

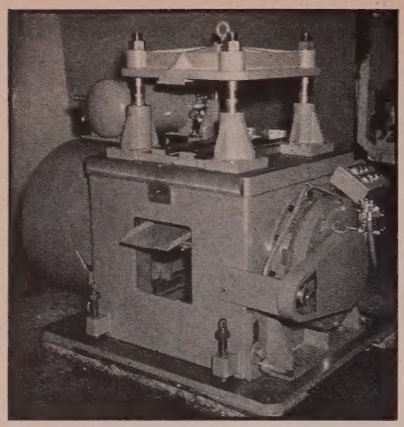
Speech given at extruder's meeting calls for development of new markets, discouragement of more firms entering field, closer cooperation between primary producers and extruders, more complete industry statistics, an end to easy credit practices by press builders and aluminum suppliers.

ALUMINUM BOATS MORE STYLISH ..... H. K. Darby **60**

Modern Metals visited the recent Chicago Boat Show; found that fiberglass boats were the most prominent in the pleasure craft field. But due to ingenious new hull designs, aluminum is far from out of the picture.

FASTENING ALUMINUM (Part 5) ..... F. L. Church **70**

This concluding article in the Fastening Aluminum series covers locknuts, locking washers, sealing washers, self-tapping studs, self-locking studs, weld studs, inserts, pins, retaining rings.



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Letters

Likes Fastener Series

Sirs:

I have just finished reading your March, 1961 issue and found it very informative and interesting. I was delighted to have the opportunity to read your articles on aluminum fasteners and feel that an outstanding contribution has been made to the light metals industry by this presentation.

May I take this opportunity to comment on your column, "Here and There," dealing with competition in the fastener field. It would appear that the volume of business quoted by Mr. Werntz of the National Screw Machine Products Association could be interpreted to have some relation to the use of fasteners. . . There is no connection whatsoever between the Association figures and the fastener industry. They are two separate fields.

Many people misconstrue "screw machine products" as including threaded fasteners. While it is true that some threaded fasteners are occasionally made on screw machines, the greater percentage—99% or more—of fasteners start out with a cold heading operation. Screw machines produce material made from bar stock, while fasteners are produced from coiled wire with a heading operation as the first step, followed by slotting, pointing, thread rolling, etc. . .

"R"—Pennsylvania

MM—Thanks for the kind words about the "Fastening Aluminum" series. We've finally finished it (concluding installment starts on page 70, this issue) and are hustling to get the entire series reprinted so that copies will be available late this month. Many people ordered reprints a few months ago, and we appreciate their patience. For those who want copies but haven't as yet ordered them, we have a reprint order form on page 81 of this issue.

As for your comments on the screw machine business, our item certainly gave the impression that we were referring to the fastener industry. Thanks for clearing up the point.

Adhesives Aplenty

Sirs:

In your March issue, "J"—Florida, inquired for a source of supply for a waterproof, watertight cement for fastening aluminum to aluminum and glass to aluminum. You may advise this party that they may obtain it from American Screen Products Co., State Rd. 24, Chatsworth, Ill. They also have a factory in Florida but all inquiries should be directed to the Illinois office.

This product, called Comastic, is a material that we believe is manufactured by Minnesota Mining, but is packed in convenient tubes and other containers by American Screen Products.

"W"—Minnesota

Sirs:

We are using two adhesives manufactured by the Gouldex Products Co., of Bellmore, Long Island, New York. They are:

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#11659-2—for glass to aluminum. Waterproof; never hardens; no pressure required and can be used at room temperature.

(*Continued on page* 14)

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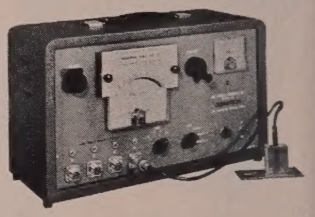

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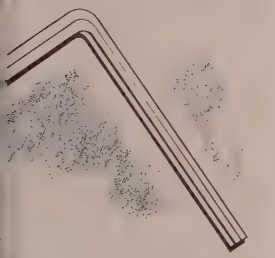

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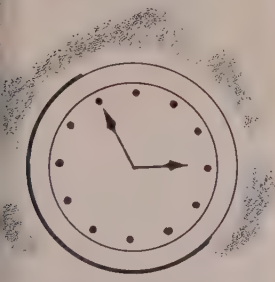

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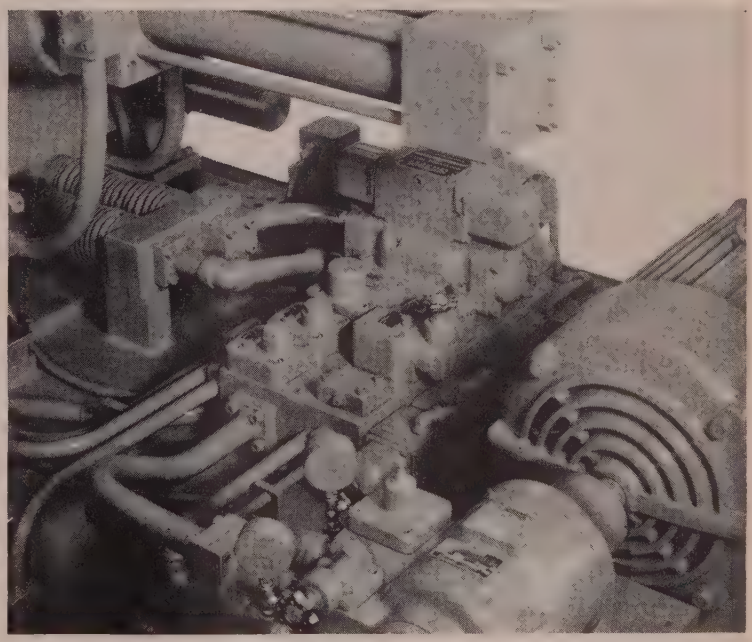

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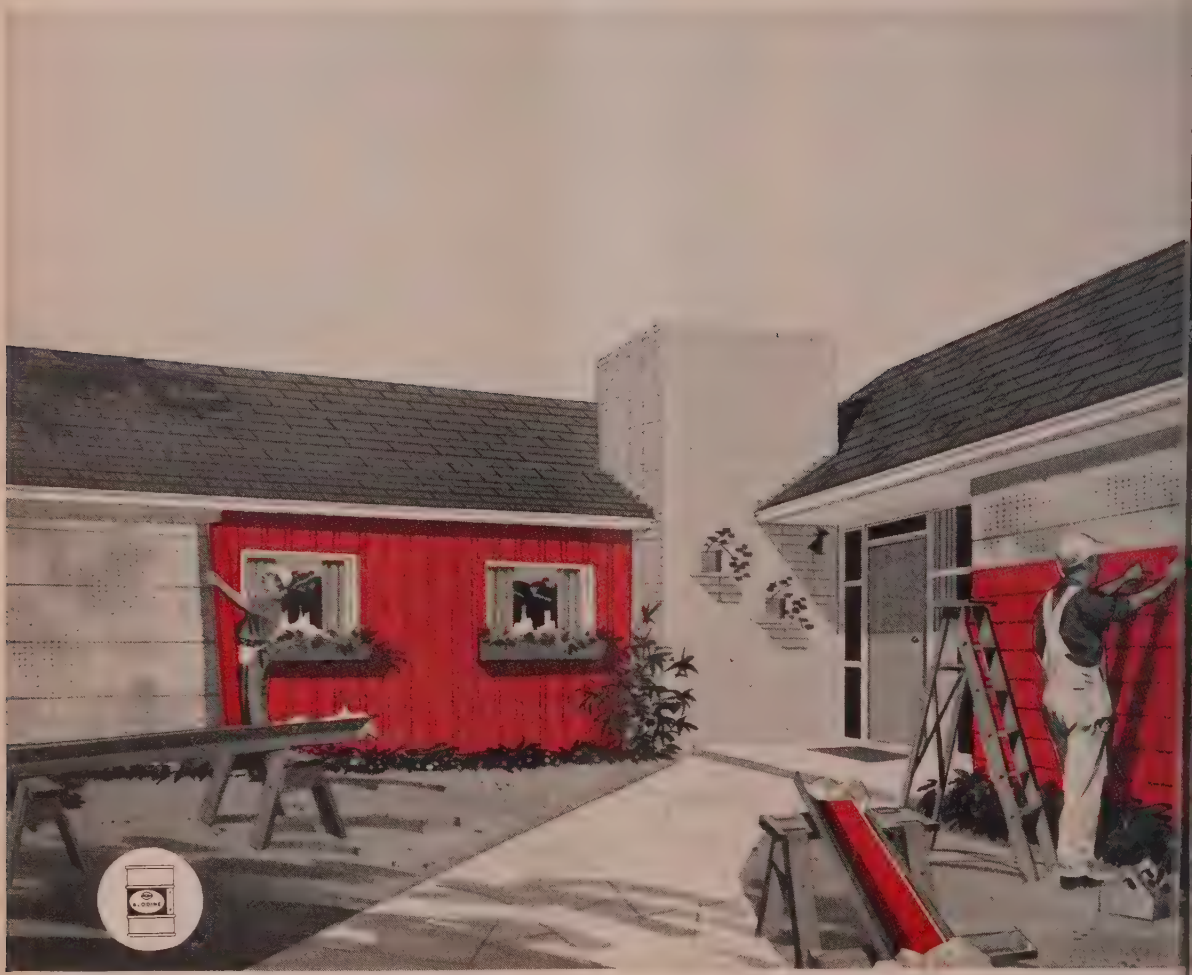

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le-by-side comparisons with an existing all-spray n at Crown's Roxboro (N. C.) plant, the new spray- mbination has demonstrated outstanding superiority over straight spray—the result of eliminating complicated, time-consuming periodic maintenance associated with spray chamber operation.

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n 5-stage Amchem spray-dip line ed on mezzanine level of plant. all length of finishing and paint 291'6".

Amchem electronic sensing device on stage one cleaner provides automated feed of chemicals.

Amchem Technical Representative conferring with Crown Production Supt. George Hagler (left) on final adjustments to new paint line.

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Write for Bulletin 1424C, gives detailed technical specifications on different Alodine chemicals available for pre-treating aluminum.

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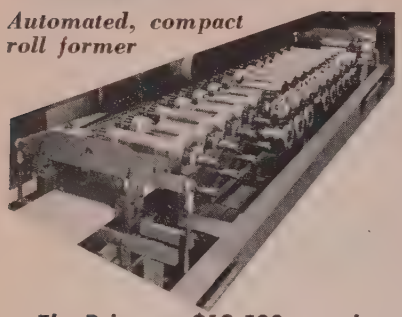

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"C"—Massachusetts

Sirs:

. . . We are marketing a material known as Ty-Saw Rhodius Stone "clear as glass" which is an epoxy resin. If you will forward Mr. "J's" address or have him contact us, I will forward a sample can. . .

"C"—Tennessee

MM—Apparently there are plenty of adhesives that will fasten glass to aluminum. The third letter quoted here was from Ty-Saw, Inc., Box 1269, Knoxville 1, Tenn. We plan to cover the subject of adhesive bonding aluminum in a thorough report later this year. Anybody else have adhesives that are suitable for aluminum?

Who Has Big Anodizing Tanks?

Sirs:

We are looking for an anodizer who has tanks at least 5 feet deep and 5 feet wide. Our problem is this:

We are fabricating large tubular aluminum "elbow" parts for a space environmental chamber. These parts must be anodized and dyed black.

So far, we have been unable to find an anodizer who has tanks big enough to handle the job.

"L"—Pa.

MM—We've sent you the names of several good anodizing companies. Is there anybody else who can handle a job this big?

Siding Tiff

Sirs:

Your article "Siding Makers Dispute FTC rules" (April '61, p. 56) does not say why the Aluminum Siding Association opposes rules relating to consumer sales of siding. The Association does not take the position that bait advertising, model home gimmicks, and exaggerated or fanciful claims on behalf of aluminum siding are justified.

It does say, however, that these and other deceptive practices are not confined to aluminum but are used and are susceptible to use with respect to all siding materials.

Trade practice rules covering aluminum siding will not protect the consumer from the unscrupulous retailer who is equally prepared to deceive and mislead while selling competing materials.

The Association's position is that if the rules are designed to do more than regulate the competitive practices within the aluminum siding industry by attempting to protect the consumer, the protection should be extended to all products which are or may be sold for the same purposes and under the same solicitation techniques.

"L"—Washington, D. C.

MM—We are inclined to agree with the Association, and did point out in the article that the home improvement products industry as a whole needed cleaning up. However, we see nothing wrong with the aluminum siding makers taking the initiative and starting a trend toward improved sales practices. By backing the proposals made by the Federal Trade Commission, the Association could lead the way to similar rulings on competing materials later on.

Needs Spin Forgings

Sirs:

We are in search of a source which can fabricate an aluminum spinforging, ten feet in diameter. It is for a missile part. . . .

"B"—Colorado

MM—One firm that might help you is Wyman-Gordon Co., Worcester, Mass. Another is Aluminum Co. of America, Pittsburgh. Still another is Harvey Aluminum, Inc., Torrance, Calif. While there might be others, we can't think of any.

Aggressive Extrusion and Fabricating Plant seeks

GENERAL MANAGER

thoroughly familiar with manufacturing and sales. Location: midwest. Good salary and opportunity for experienced man.

Replies in confidence to

Box 578, MODERN METALS
435 N. Michigan Ave.
Chicago 11, Ill.

PLANT MANAGER

Medium sized Midwest extruder, fabricator, and finisher has opportunity for a man experienced in manufacturing of extruded products. Knowledge of punch press and forming, as well as extrusion, is desirable.

We are a progressive and expanding company in need of a capable, technically qualified administrator who would like the necessary responsibility and authority to accomplish his work.

Our offer — an interesting opportunity, good wages and benefits, profit sharing and recognition of accomplishments.

Please reply giving education, work history, and salary requirements. Reply to:

BOX 533

MODERN METALS

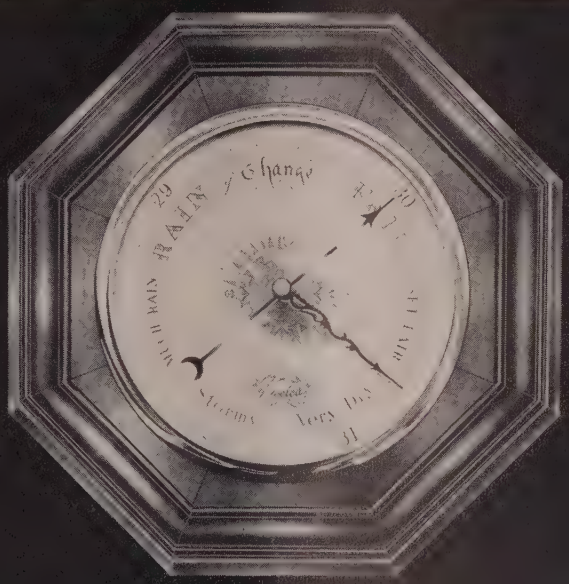
435 N. Michigan Ave. Chicago 11, Ill.

WANT NEW BUSINESS?

Lots of new business from light metals fabricators and product manufacturers is obtained through half-column advertisements like this one.

And the cost is sure low —only $75 per insertion on an annual basis.

Want details? Write Paul Messer, Modern Metals, Tribune Tower, Chicago 11, DE 7-0638.



FAIR WEATHER OR FOUL

GENERAL EXTRUSIONS

Maintains As-Ordered Delivery

ON THIS PART

FOR

TRANE CLIMATE CHANGERS

A unique combination of skilled engineering and pleasing design is one reason for the widespread acclaim of 3-ton, 5-ton and 7½-ton self-contained Climate Changers by the Trane Co. General Extrusions, Inc. is proud to play a role in the manufacture of these attractive, efficient air conditioners.

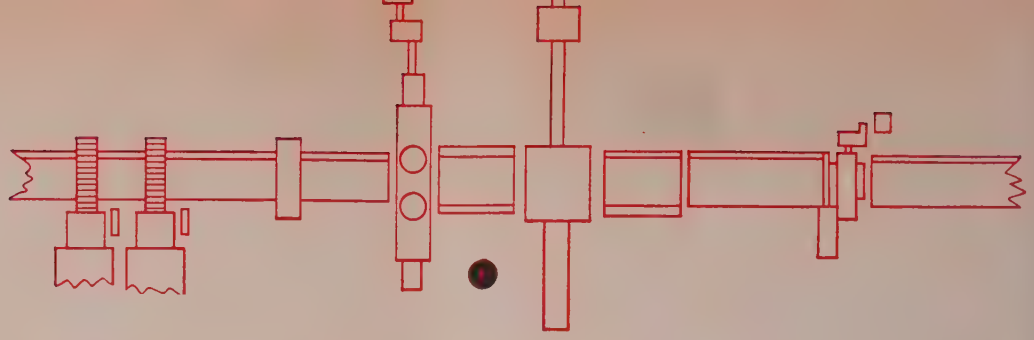
The aluminum extrusions furnished by General are precision extruded, punched and Generalsatin anodized . . . the latter, one of five special Generaline finishes. This beautiful natural finish is guaranteed not to rub off black or smudge. Like so many leading manufacturers, the Trane Co. has found that G.E.I. is geared to rapid, accurate production and unfailing delivery.

Why not let G.E.I. handle your parts extruding, additional fabricating and other special needs and problems? Write for catalog explaining G.E.I.'s many services.

GENERAL EXTRUSIONS, INC.
4040 LAKE PARK ROAD, BOX J
YOUNGSTOWN 7, OHIO

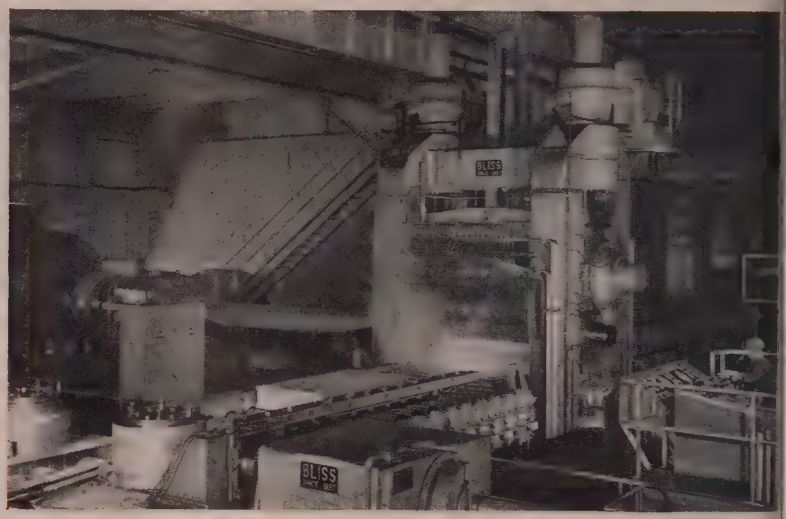
Sales Offices at Chattanooga, St. Louis, Pittsburgh, Cincinnati and Cleveland

CONSULT YOUR CLASSIFIED PHONE BOOK UNDER ALUMINUM PRODUCTS

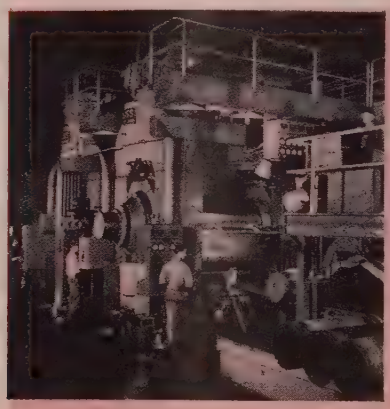


At Olin Mathieson's new aluminum rolling plant...

all reductions—HOT and COLD—are done on Bliss mills

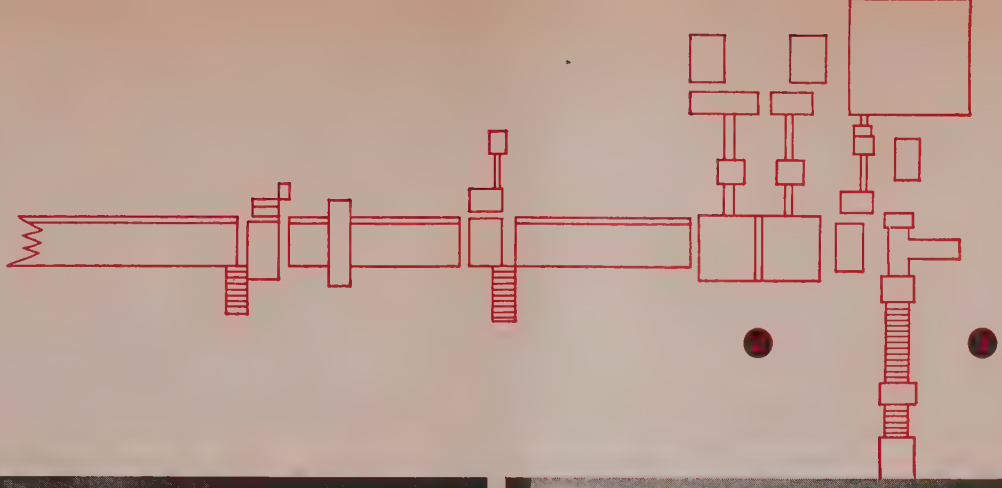


Five-ton, 16- and 20-inch thick aluminum ingots are broken down to ½-inch thickness in a series of passes between the work rolls of this Bliss 4-high reversing hot mill. Vertical edging rolls can be seen at the far left.

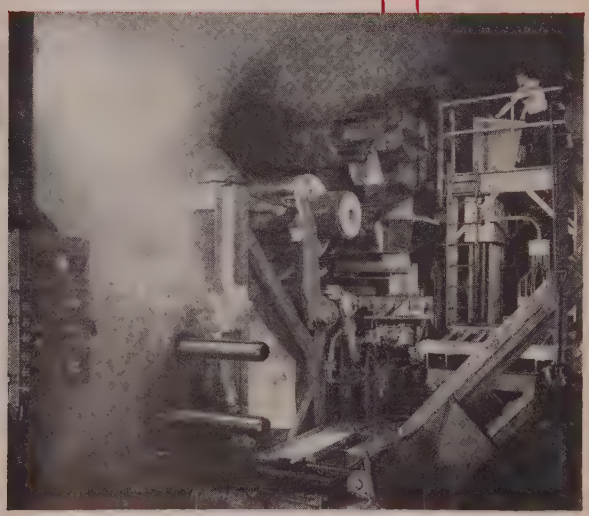


Four-high two-stand tandem cold mill reduces 10,000-pound coils of hot rolled strip to gages as fine as .010" at speeds in excess of 1200 feet per minute. Coil handling equipment on this mill includes both coil box for feeding heavier gage material and mandrel-type payoff reel for lighter gages. Delivered strip is taken up on a tension reel with horizontal belt wrapper.

Gages as fine as .006" can be rolled on this four-high cold finishing mill, the last reduction mill in the line at the Omal plant. Mack-Hemp rolls play an important part in several of these mills.



Single pass through this hot finishing train reduces the plate delivered by the reversing mill to hot rolled strip. Coming from the last mill stand, the strip's edges are trimmed and...



...it is taken up on this hot mandrel coiler and horizontal belt wrapper. These auxiliaries wind it into neat coils for further processing.

At the brand new Omal, Ohio, plant of Olin Mathieson Chemical Corporation, every step of rolling 10,000-pound aluminum ingots down to .006" strip is done on Bliss equipment. Rated capacity of the mill is 10,000,000 pounds of finished rolled aluminum products every month, a figure already surpassed.

Besides the various mills, Bliss built and installed all the tables and other auxiliary equipment required for the complete strip rolling operation.

The part played by this rolling mill equipment in the new Omal plant's production facilities is testimony to Bliss' long record of successful installations in the aluminum industry. For information on other representative Bliss rolling equipment and auxiliaries in both ferrous and non-ferrous plants, write today for our 84-page Rolling Mill Brochure, Bulletin 40-B.

BLISS
SINCE 1857

Bliss is more than a name
...it's a guarantee

E. W. BLISS COMPANY
Rolling Mill Division • Salem, Ohio

Subsidiary: The Matteson Equipment Company, Inc., Poland, Ohio

DIMENSIONALLY STABLE TO 0.00001" PER INCH

Parts in computing devices, aircraft or missile guidance systems, and electronic equipment must be dimensionally stable, sometimes to a few millionths of an inch per inch. Two factors interfere with such dimensional stability: (1) locked-up stresses and (2) growth. While there are many approaches to the solution of this problem, most involve a lot of time and trouble, but contribute little to stability of parts.

The most positive solution is the use of Precedent 71 aluminum casting alloys which may be stress relieved by heat treatment at 700°F for four hours followed by cooling in still air. This stress relieving heat treatment is applied to the raw casting and no subsequent treatment is required. After stress relieving at 700°F, Precedent 71 A and B alloys are completely dimensionally stable to 0.00001" per inch.

Write for Free Bulletin

WILLIAM F. JOBBINS INCORPORATED

P. O. BOX 230C
AURORA, ILLINOIS

Here and There

Inside School Market « « The U.S. Governmen will be spending more than $5.5 billion in the coun of its five-year aid-to-education program; and this only a fraction of the total expenditure required place our educational system on a firm footing. need hardly be pointed out that here is a "tailor-made market for aluminum fabricators—and we are not i ferring so much to the architectural aspects (th primary producers are grinding out plenty of promotio to keep architects, educators and school boards i formed about aluminum) so much as the furnitur appliances and special equipment that turn scho interiors into efficient teaching areas. We touched o this exactly a year ago in our article which describe the products and operations of American Seating Co Grand Rapids, Mich. (MM, May '60, p. 46). Actuall furniture is only a part of the school equipment ma ket. Another important part is in interior walls semi-permanent and moveable partitions in a grea range of sizes and composition which will give scho buildings much greater flexibility in use. We noti that design of an award winning school, the Linto High School in Schenectady, N. Y., includes expan able classrooms that have moveable walls. The arch tectural firm of Perkins & Will, Chicago, shared in th award. (Philip Will, president of the American I stitute of Architects, recently contributed some goo advice to the aluminum industry (see MM Apri 1961, p. 50). The Linton H.S. walls might not be al minum and foamed plastic panels, but they could b This is only a facet of the "school interiors" mark which perhaps can be cultivated more than it has bee

Trim Results « « There's nothing quite as co vincing as an "unsolicited testimonial." Looks as thoug aluminum has one in the survey of a South Carolin regional housing authority which was reported r cently in the New York *Times*. It seems as thoug the authority built identical dwelling units but trimme half with aluminum and half with wood. After eigh years, the housing people inspected the project an pronounced the aluminum trim superior to the woo because it "still presents a crisp, new appearance with out one cent of maintenance." The wood trim, c course, required repainting (twice), and there was certain amount of replacement of damaged trim se tions. According to the National Association of Hou ing and Redevelopment Officials, the original cost the two types of trim was about the same. Now th authority is reported to be using aluminum for win dows, screen doors, TV antenna brackets and vent

Wanted: Business Billy Graham « « These ar times of travail for some of the corporate giants, wh with Chrysler's difficulties with an inordinately hung president, the convictions of various executives in th electrical equipment industry for their part in acts c price fixing, and the continuing efforts of the U. S Government to effect a proper cleavage betwee Du Pont and General Motors. Now the Governmen has brought a criminal action against General Moto

HOMOGENIZING FURNACE

lanly

for
- Uniform treatment
- Rapid Heating Cycles
- Economy of Initial Cost and Operation

ANLY HI-TEMP PANELS are operating at nperatures up to 1250° F. Contrasted with nventional brick construction, they afford the llowing:
Lower initial material investment cost.
Lower installation cost.
Lower maintenance cost.
Lower operating cost.

The development of LANLY HI-TEMP PANELS made possible this aluminum billet homogenizing furnace.
Available in either hot car or car bottom type, it is representative of the many Lanly installations in the light metals industry.

THE lanly CO.

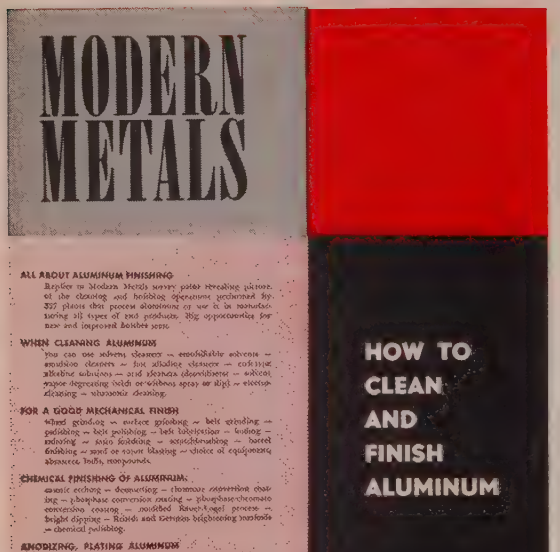
Lanly custom designed equipment of panel construction is available for a wide variety of heat processes.
Bulletin No. 480 entitled, "Lanly and Light Metals" pictures several of them.
Write for your copy.

Find Your Representative In The Yellow Pages

LIGHT METAL OVENS • 2805 Euclid Ave., Cleveland 15, Ohio

Atlanta, Georgia • Birmingham, Ala. • Boston, Mass. • Chicago, Ill. • Cleveland, Ohio
Toronto, Ontario • Columbus, Ohio • Detroit, Mich. • Buffalo, N. Y.
Pittsburgh, Pa. • Rochester, N. Y. • San Francisco, Calif. • St. Louis, Mo.

36 pages
all about finishing aluminum



This valuable 36-page reprint is still available at $1.00 per copy in quantities from 1 to 25, and 50 cents per copy in any quantity over 25. To order, simply fill in the form below and mail, with payment, to . . .

MODERN METALS

1810 Tribune Tower **Chicago 11, Ill.**

Send me_____copies of the reprint, "How to Clean and Finish Aluminum." Payment is enclosed.

NAME _____

TITLE _____

BUSINESS _____

COMPANY _____

STREET _____

CITY _____ ZONE _____ STATE _____

5-61

in which it is charged that GM has a monopoly in the diesel locomotive field. The U. S. charges that GM achieved this by threatening the various railroads with loss of General Motors traffic if they didn't buy locomotives from GM's Electro-Motive Div'n. The Federal indictment also charged that GM's overall size and great wealth enabled it to cut sale prices and invest in locomotive manufacturing plants to the disadvantage of its competition. Two big companies, Fairbanks Morse and Baldwin-Lima-Hamilton, couldn't compete against these tactics, and stopped building diesel locomotives. To this latest revelation of seaminess in American business could be added the aluminum industry's unfair disadvantage at the hands of the steel industry, which doesn't believe freight cars should ever be made of aluminum. Here again, the all too compliant railroads can take their share of the blame. How about a series of revival meetings for the business fraternity?

Relaxation Booming Furniture « « Broader participation in what has come to be called casual living, expansion of patio and family room, a quickened interest in back-yard life — all are welcome signs for the aluminum industry. No material seems to fit in with these new living areas the way the light metal does. They certainly have been a boon to the summer and outdoor furniture industry. Robert R. Henningsen, Reynolds Metals Co.'s recreational market manager predicts that this industry will use more than 60,000,000 pounds of aluminum by 1965. "Aluminum recreational furniture, traditionally used outdoors, now is winning new acceptance for indoor use in family rooms and other recreational areas," Henningsen said. "This is a direct result of recently introduced high styled aluminum lines." Henningsen said that the light metal is used in more than 70% of all summer and casual furniture now on the market; that more than 50 million pounds of aluminum is consumed annually, mostly of drawn and welded tubing and extruded shapes.

Wheels Next Big Auto Use? « « Aluminum wheels with brakes that won't fade probably will be the next major light metal application of aluminum in automobiles if Kaiser Aluminum & Chemical Corp. has its way. Kaiser automotive development engineers point to results of tests on integral aluminum wheels and brake drums. R. G. Stanwood, manager of Kaiser Aluminum's automotive development program, said they conclusively demonstrated the superior brake performance, ride and strength of the aluminum wheel. "As a result of these tests," Stanwood said, "we believe the aluminum wheel eventually will become standard on American automobiles, replacing the steel disc wheel just as it succeeded the firmly established wooden spoke wheel more than 30 years ago." In a joint program with the Bendix Corp., the aluminum wheels were tested on wheel dynamometer, on local road test cars and at Death Valley where 95°F. temperatures prevailed. Sixteen consecutive stops from 70 mph were made in a brake dynamometer on both the production steel wheel and the aluminum integral wheel, hub and drum. These tests showed that the latter represents a much more efficient wheel.

SPECTRO-GRAPHICALLY ANALYZED

Every sheet, coil or tubing shipment of Quaker State aluminum is now certified in writing. It's your assurance that *your* order has passed our rigid standards of quality control to meet your exacting specifications.

SPECTROGRAPHICALLY ANALYZED
Our quantometer spectro-chemically analyzes every rolling ingot cast at Quaker State. It determines within a tenth of one percent the amount of each alloying element. Wet Chemical Analysis will be made by our chemists when requested.

QSM

HOWE SOUND COMPANY

QUAKER STATE METALS COMPANY

Lancaster, Pennsylvania

A DIVISION of HOWE SOUND COMPANY

Mill Producers of Aluminum Sheet, Coil, Tubing and Extrusions

FOR P.A. HEADACHE!

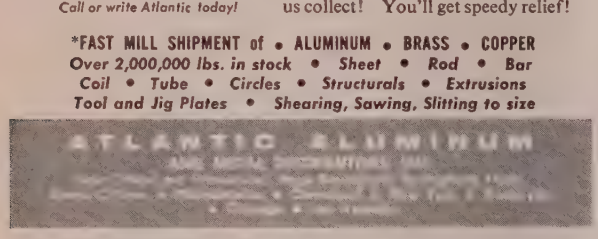
Let Atlantic Fill Your Prescriptions!

Our Sales Engineers are available for quick diagnosis . . . or if you prefer, we'll send you a complete "Quick Reference" listing of our Stock-on-Hand.

Call or write Atlantic today!

Atlantic's combination of active ingredients* works like a doctor's prescription. It helps relieve P.A. headache and tension caused by High Costs, Late Delivery, or general Un-availability. Atlantic effectively eliminates the cause of such distress. Next time you're suffering from P.A. headache call us collect! You'll get speedy relief!

***FAST MILL SHIPMENT of • ALUMINUM • BRASS • COPPER**
Over 2,000,000 lbs. in stock • Sheet • Rod • Bar
Coil • Tube • Circles • Structurals • Extrusions
Tool and Jig Plates • Shearing, Sawing, Slitting to size



ANODIZED ALUMINUM

• *CLEAR* • *BLACK* • *ALL COLORS*
• *MATTE OR LITHO FINISH*

CONTINUOUS COIL ANODIZING

• GAUGES . . . FOIL AND SHEET
• 100# COILS X 12" WIDE
• TEMPER . . . DEAD SOFT TO FULL HARD
• PAPER INTERLEAVED • PERFECT CONTINUITY OF COLOR

A Quality Product . . .
Ready for your Production Line!

RUSMAR PROCESSING COMPANY
212 NORTHWEST HWY. • FOX RIVER GROVE, ILL. • MErcury 9-3144

New Enterprise

A new plant which will manufacture aluminu **storm doors and windows** will be put in operation i early May by W. P. Fuller & Co. in Pocatello, Idah Security Mfg. Co., Detroit, will supply extrusions t Fuller. Fred Simons will supervise operations at th new plant.

Another manufacturer is entering the **residenti siding** fray. Kaufmann Window & Door Corp., Detro has established a siding plant at 13271 Mt. Elliot Here, white, gray, beige, green and yellow siding an a complete line of accessories and trim parts will b made. Kaufmann siding will be sold through deale in the U. S., Canada, Puerto Rico and the Netherland Robert Yazejian is general manager of Kaufman Siding Corp.

Major structural **aluminum forgings** for the T- Talon aircraft will be made by Aluminum Co. Canada under contract to Northrop Corp. The T- is the first U. S. supersonic jet trainer. Plans call f construction of 750 planes.

Insect wire screening will be made in the new pla of Keystone-Seneca Wire Cloth Co. at 210 W. Waln St. in Fullerton, Calif. Plant manager is Kenne Walker; sales manager William Kempton.

Cannon Electric Co. recently dedicated its new al minum **die casting** plant in Los Angeles. The 15,0 square-foot facility cost $250,000.

In an effort to speed development of Canada's fo **container** industry, Aluminum Co. of Canada has pu chased Cochrane Foilwares Ltd., Rexdale, Ontari Can. The firm is now called Foil and Container Div of Alcan; will receive raw materials from Alcan's King ton foil rolling facility.

Aluminum **pulley stock,** 8 inches long and with 1/5-inch pitch, is being offered by H. Neuman & Co Skokie, Ill., for use with U. S. timing belts. The sto can be cut to any desired size. Number of grooves o the stock range from 10 to 36 and pitch diameter com in sizes from .637 to 2.292.

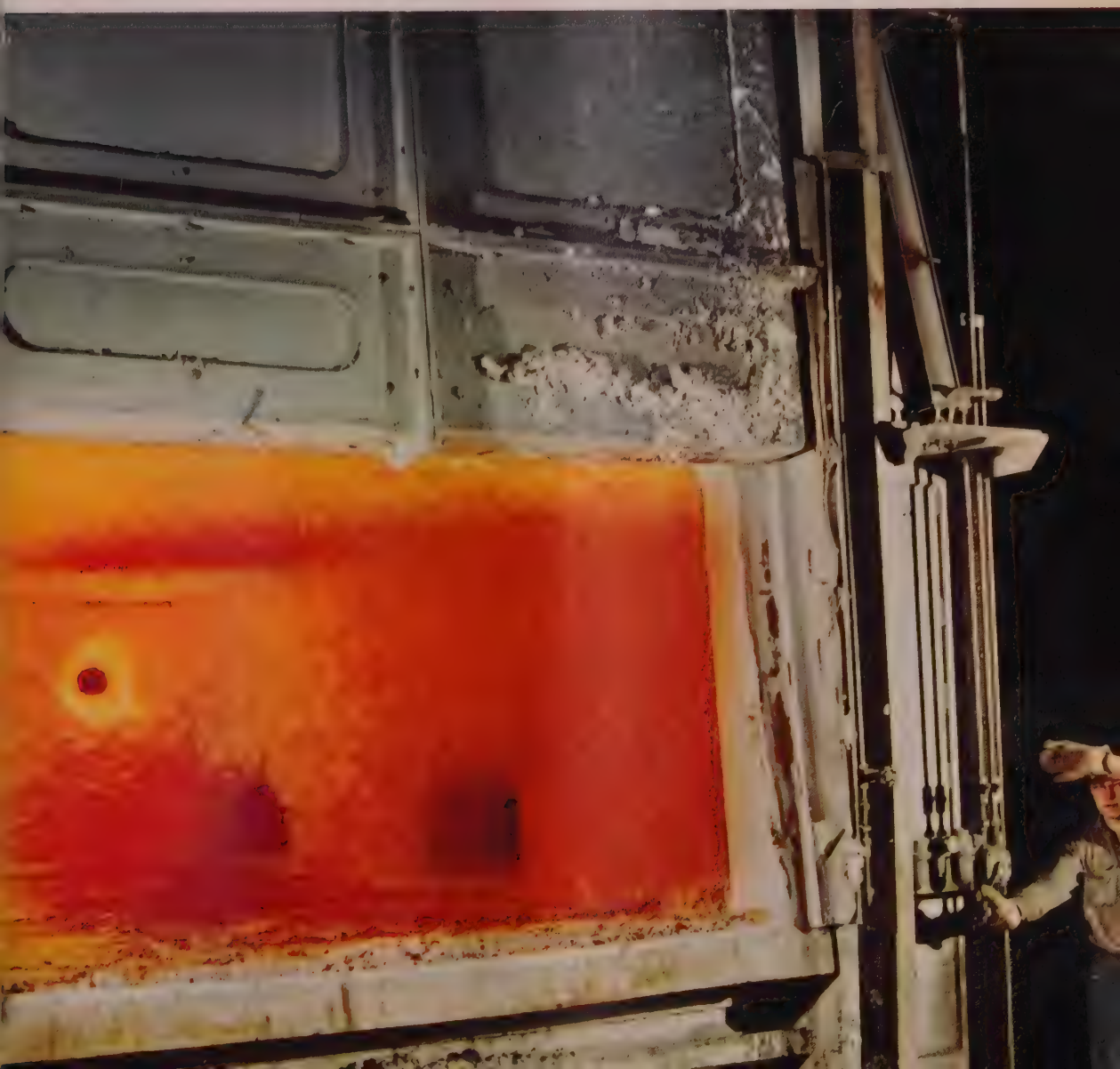
Republic Foil Inc., Danbury, Conn., has acquire Consolidated Bag & Foil Corp., Somerville, Mas producer of foil insulated ice cream bags and oth **laminated foil** specialties. The acquisition will increa Republic's annual sales to $10 million, says the firm

A lightweight expandable **aluminum beam** for u in supporting forms during casting of concrete a being fabricated by Aluminum Co. of America, a will be leased and sold by Hico Corp. of America, 1 Broadway, New York.

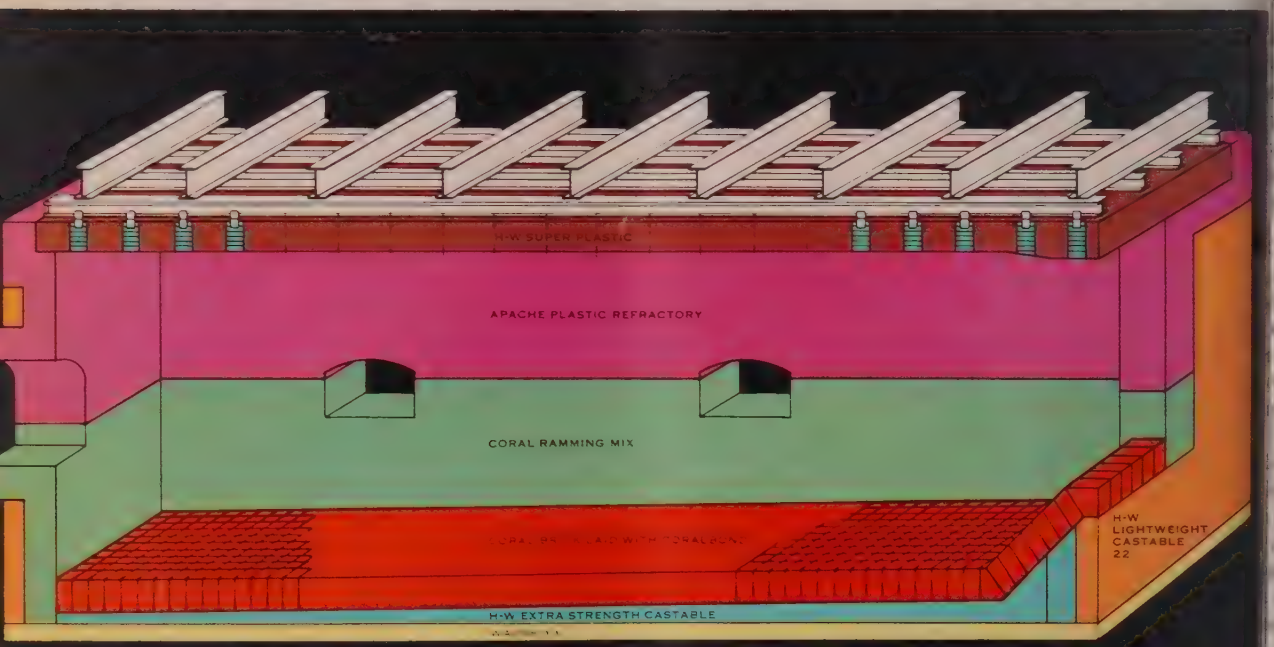
In a $1 million cash transaction Hahn Inc., Evan ville, Ind., bought Eclipse Lawn Mower Co. of Prop

THIS HIGHLY SUCCESSFUL ALUMINUM MELTING FURNACE FEATURING MONOLITHIC CONSTRUCTION WAS BUILT ENTIRELY OF HARBISON-WALKER REFRACTORIES.

Construction and product details are given on the following page. PHOTO: COURTESY OLIN-MATHIESON CHEMICAL CORPORATION



ORAL BRICK, CORALBOND AND CORAL RAMMING MIX WERE ESPECIALLY DEVELOPED
Y HARBISON-WALKER FOR ALUMINUM MELTING FURNACES. THEY HAVE ALREADY
EMONSTRATED UNUSUAL RESISTANCE TO PENETRATION AND CORROSION BY ALU-
INUM ALLOY REACTION . . . AS WELL AS TO THERMAL SHOCK, SPALLING CONDI-
IONS, AND SEVERE IMPACT AND ABRASION. THE REFRACTORY USED IN EACH
URNACE SECTION WAS SELECTED TO ASSURE THE BEST BALANCED SERVICE LIFE.



ALSH XX

strong, power pressed, gh duty fireclay brick.

-W EXTRA STRENGTH ASTABLE

refractory concrete of out-anding physical strength.

CORAL brick, laid with CORALBOND

These specialized high-alumina brick and mortar have exceptional high strength to withstand spalling and slagging influences, and provide remarkable resistance to molten metal reaction.

CORAL RAMMING MIX

This companion product to CORAL brick and CORALBOND, installed by gunning or ramming, has excellent resistance to molten aluminum alloys and develops great strength at operating temperatures.

H-W LIGHTWEIGHT CASTABLE 22

An insulating monolith.

APACHE PLASTIC REFRACTORY

A high alumina (60%) monolith with refractoriness equal to brick of this class but with much lower permeability.

H-W SUPER PLASTIC

A monolith with very good workability and refractoriness equal to superduty brick.

WRITE FOR DATA Complete product descriptions and test data are available showing the superior resistance of these refractories to aluminum alloy reaction.

HARBISON-WALKER REFRACTORIES COMPANY AND SUBSIDIARIES

GENERAL OFFICES: PITTSBURGH 22, PENNSYLVANIA

World's Most Complete Refractories Service

HW 61-7

wn, Ill. Eclipse manufacturing facilities, for mak- eel-type, rotary and riding **mowers** and chain saws, be transferred to Evansville this summer. Hahn s rotary garden tillers and farm spraying equip- .

w **metal finishing** facilities designed to meet the asing demand for this work are now in full opera- at Almgard Metal Finishers, Inc., 114 Westview Marietta, Ohio. Now the company can produce anodized and textured surface treatments for inum and high quality painted finishes for other lls.

me 26 million dogs (presumably the U.S. canine lation) are a new market for Nichols Wire & inum Co., 1725 Rockingham Road, Davenport, . The product is Nichols' Aluminum **Dog Run,** t-free, inexpensive and strong cable with mount- xtures and slip ring which gives the leashed hound o 500 square feet of play space.

R. Donnelley & Sons Co., 350 E. Cermak Road, ago, are building new printing facilities to handle uction of a new Alcoa line of printed foil **packag- materials.** Alcoa's re-entry into the printed alumi- foil business will probably take place in October, wing installation of ultra-modern equipment and letion of test runs.

yogenic **couplings,** built in accordance with Army stic Missile Agency and Ordnance Corps specifica- are made of cast aluminum. The units give posi- sealing by means of a replaceable semi-soft "LOX" patible plastic gasket, mounted in an aluminum Units are made by Cosmodyne Corp., 12833 ns Ave., Hawthorne, Calif.

ad-bearing columns are an integral part of **sliding door** design by Miller Sliding Glass Door Co., 3216 Valhalla Dr., Burbank, Calif. Heavy steel s encased in aluminum may be incorporated in er aluminum frames at the muntin bar, interlock- nd meeting jambs—within the depth of sill and section. It eliminates 4 x 4-inch columns and ts other advantages.

aluminum hammer case makes new Ingersoll-Rand **ct wrench** lighter and therefore less tiring to use. Phillipsburg, N. J. company's Model 844 Im- ool has a 20% power increase over the previous el, has a handling capacity up to 1½-inch bolt average impact rate of 700 per minute with 75% r rundown than before. Free speed is 3500 rpm) psi.

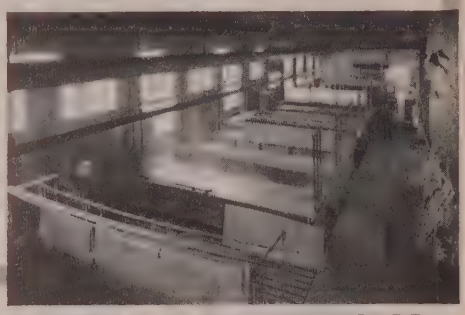
ame and caps of new **revolution counter** made by ler-Root, Inc., 70 Sargeant St., Hartford 2, Conn., lack anodized aluminum. The Series 1736 counter signed for high readability in below-eye-level in- nents.

ch drafting and **art tools** as pen holders, utility es, and draftsmen's lead holders are given alumi- bodies by the manufacturer, Griffin Mfg. Co.,

ALUMILITE
Sulfuric Acid Anodizing

Parts big or little, many or few

- 25 years experienced know-how can spell the difference between expensive and economical costs for you.
- Completely equipped for single job or contract work, with ample warehousing facilities, available to meet your production schedules on practically any size job.
- Send sample or drawing when requesting quotation.
- Anodizing to government specifications.
- Authorized licensee since 1932.
- It will pay you to know the Why, How and Where of Alumilite. Informative literature available.



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CITY PLATING & POLISHING CO.
DIVISION OF CIPCO CORPORATION
22nd & Cole Sts. St. Louis 6, Mo.

You ask for it—we'll send it!

New booklet tells all about GRAFO—the super-protector

Use GRAFO Water Products for high heat and excessive pressures, for press forging, extruding, etc. Use GRAFO Oil Dispersions for hammer forging, oven conveyors and general industrial applications.

▶ Send for this booklet, explaining the proper graphite dispersions for specific operations. Use the coupon.

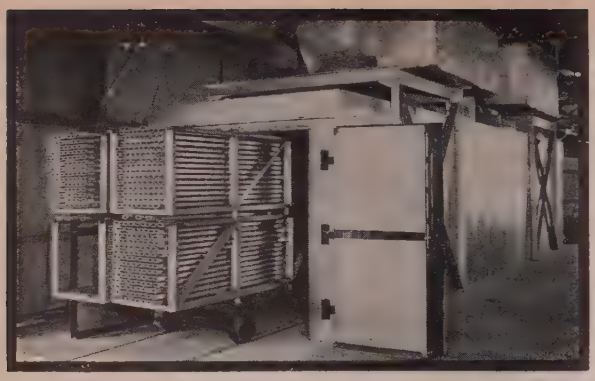
GRAFO COLLOIDS *Corporation* • Sharon, Pa.

Mail this coupon today

GRAFO COLLOIDS CORP. 1
259 Wilkes Place, Sharon, Pa.

Please send new booklet on GRAFO colloidal dispersions, to

Name of Company_____
c/o Mr._____
Street_____
City_____ Zone_____ State_____



carl mayer Designs and Builds
Better ALUMINUM Extrusion
AGEING OVENS

This truck type oven is now in service at Penn Extrusion Corporation, Erie, Pa. Close temperature control is maintained through the use of two gas fired, recirculating air heating systems. Other Carl Mayer design features assure trouble-free, economical operation. Write for Bulletin HT-53.

THE **carl mayer** CORP.
20800 CENTER RIDGE ROAD, CLEVELAND 16, OHIO
OTHER PRODUCTS: Core & Mold Ovens • Rod Bakers • Paint and Ceramic Drying Ovens • Special Processing Equipment & Accessories

COLD PUNCHED
MACHINE SCREW NUTS

• HEXAGON
• SQUARE
• SMALL PATTERN
• STANDARDS
• SPECIAL
STEEL and ALUMINUM

NEW ENGLAND NUT MFG. CO., INC.
17 VIKING TERRACE • WORCESTER, MASS.

Inc., 1659 Ridge Rd. East, Webster, N. Y. Mal points out that they're "lightweight, easy to cle and will last a lifetime."

Post-cookout cleanups will be greatly minimi when the lord of the manor discovers Fry-A-Foil posable foil **fry pans,** a new product of Metal F Products Mfg. Co., 11 St. Marks Ave., Linden, N. Metal Foil's Don Becker calls Fry-A-Foil "a natu successor" to Broil-A-Foil, the company's disposa broiler. The fry pans feature a detachable wire han which allows replacement of the fry bottoms. The bottoms are made by Ekco-Alcoa Containers I Wheeling, Ill.

Thin-walled, fabricated **fittings** are made in alu num, steel and 304 and 316 stainless by Alleghe Coupling Co., 419 Third Ave., Warren, Pa. In alu num, wall thickness is .125-in.; steel and stainless .0598-in. wall, except the 6-inch size which has .07 inch thickness. Other sizes are 2, 2½, 3 and 4-in Belled ends are provided for adjustment and e of welding.

New portable **electric drill,** called Safe-T-Drill a made by Millers Falls Co., Greenfield, Mass., c original designed weight by 20% by use of aluminu for housing. The new ¼-inch tool features protecti against shock. It operates on standard power. A li of 14 attachments are available. Included are a sand sabre saw and 5½-inch circular saw.

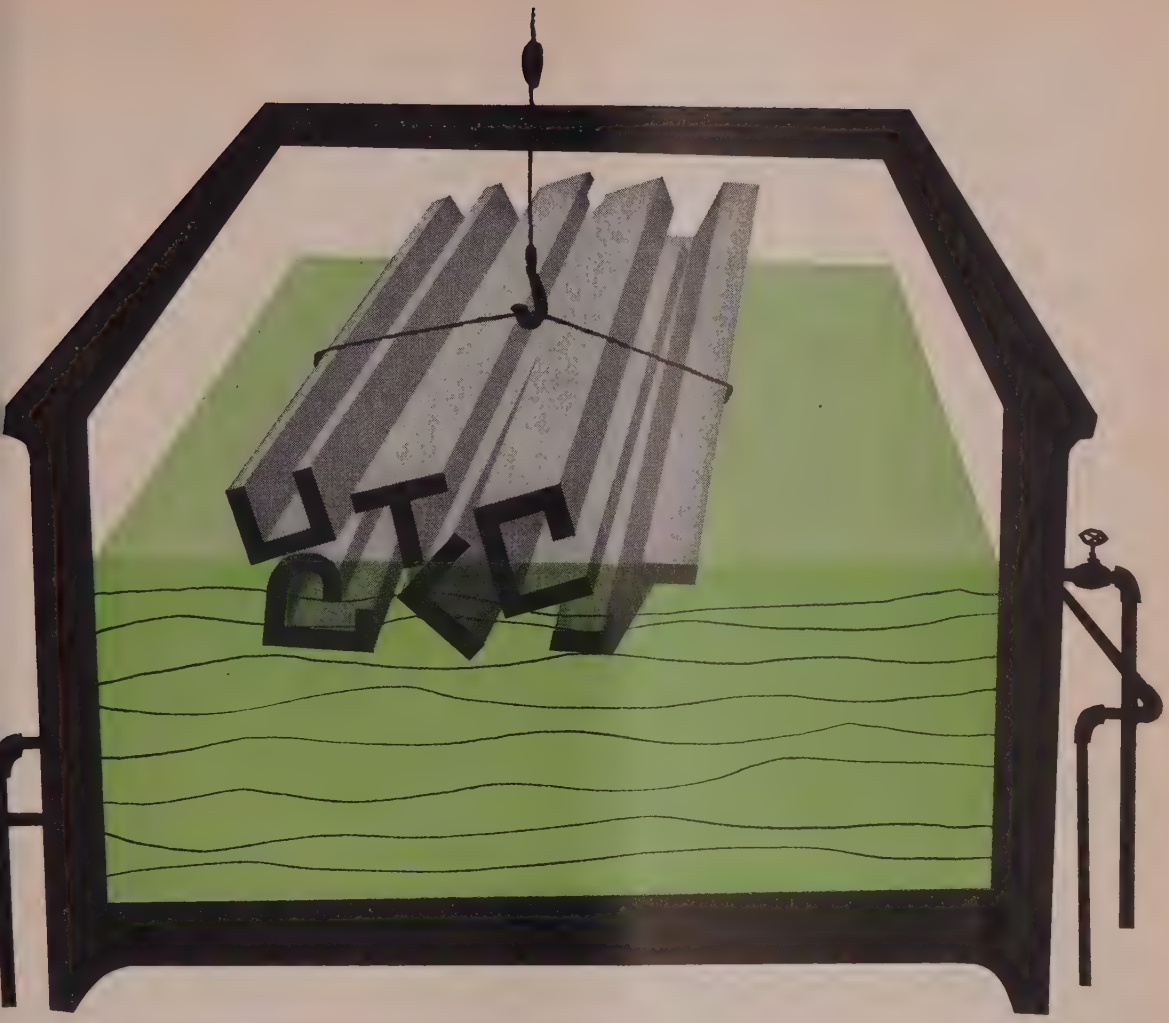
Sliding **grills** that act as safety guards for openi of various types are made in aluminum or steel Cornell Iron Works, Inc., 36th Ave. and 13th St., Lo Island City 6, N. Y. Typical uses are at parking garag cafeteria counters, shopping arcades, storage bins a loading platforms.

Air and low-pressure hydraulic **cylinders,** from 1 to 3½-inch bore, are simply designed using a one-pi aluminum piston; hard-chrome plated piston ro aluminum end caps; and seamless brass tube. Ma facturer, Mo-Bar Hydraulics Co., Crystal Lake, I says units have proved both versatile and dependab on all fluid-power applications.

Gold anodized aluminum banding forms the fra hands and markers of **clocks** designed as wall scon They are called Clock-n-Sconce and are made Turner Mfg. Co., 2309 S. Keeler Ave., Chicago.

Clayton Mark & Co., 1900 Dempster St., Evanst Ill. has added aluminum **conduit** to its line. The co pany has been a manufacturer of steel conduit the past 50 years. The aluminum will be made in ½-inch to 6-inch sizes. One supplier of the alumin conduit pipe is Benson Aluminum Co., Inc., Conn ville, Ind.

New line of small diameter **pulleys** designed for on light machinery and instrument drives are m of aluminum in the larger OD's, steel in smal "QV" pulleys, produced with groove dimensions RMA standards and compactly designed for sp economy in confined areas, are made by Climax M Products Co., 863 E. 140th St., Cleveland 10.



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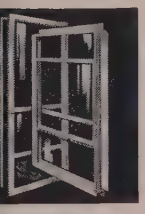
ith the Pennsalt System Approach



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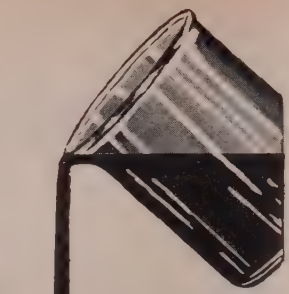

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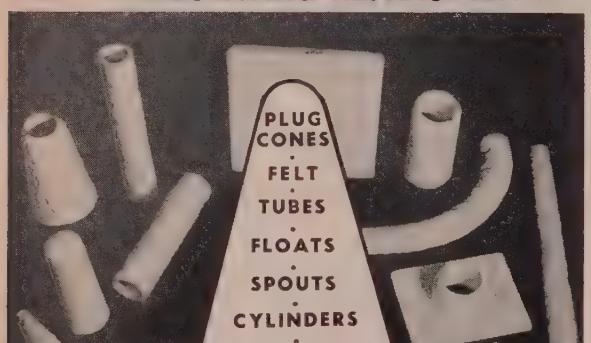

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Useful Data

Aluminum alloy sheet, coil and blank data needed most often by product designers, architects, engineers and purchasing departments are summarized concisely in a new 3-way Design Data file developed by Fairmont Aluminum Co., Fairmont, West Va. The handy data file may be used as a wall chart, file folder, or insert in catalogs and specs for fabrication or construction. Principal selector chart outlines detailed data on ten most used alloys, including applications, uses, strengths, thermal and electrical conductivity, density, specific gravity, melting range and manufacturing limits. Basic manufacturing data is augmented with reference charts on weights, tolerances, fabrication characteristics, available finishes, hardening properties and embossing designations. Write to A. J. Snider for this data file.

Alodine treatments for aluminum are discussed in a new folder prepared by Amchem Products, Inc., Ambler, Pa. Included are a description of how this proprietary conversion coating works. The various methods of applying Alodine are also illustrated. Characteristics of Alodine coatings are listed and a selection chart gives the prospective user such information as method of application for the various Alodine formulas, approximate coating time, operating temperature range, government specs that apply, and the type of coating produced. J. D. Breen will send this brochure on request.

"High strength aluminum alloys that do not require heat treatment" are the subject of a new technical brochure prepared by Apex Smelting Co., 2537 W. Taylor St., Chicago. Ternalloy is the name given to this series of alloys because magnesium and zinc are combined with aluminum to form a ternary compound which acts as a single element; a small amount of the ternary compound, alloyed with aluminum, results in an alloy with high elongation and high tensile properties. By increasing the amounts of this constituent one gains higher yield strengths. The brochure contains ageing curves showing increasing hardnesses, tensile strengths and yield strengths of the alloys in sand cast and chill cast forms until they reach stability; chemical and physical properties; facts on such qualities as machinability, polishing, brazing, etc. A. J. Peterson will send this brochure on request.

Engineered systems for conveyors, washers, drying and baking ovens and special paint applicating methods are described in a 32-page illustrated brochure prepared by the Spra-Con Co., 3600 N. Elston Ave., Chicago. It offers basic information on finishing system engineering. Amply illustrated, the booklet introduces a few pieces of the broad range of equipment for material handling products. Write to O. L. Weis for this booklet.

Installation of hexagon elastic stop nuts is fostered by the new Torque Tension Manual No. 6101 recently brought out by Elastic Stop Nut Corp.

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America, 2330 Vauxhall Road, Union, N.J. The new 18-page ESNA design manual includes a dozen tables listing specific recommended installation torque values for thin and standard height UNC and UNF hex type Elastic Stop nuts. It discusses factors to be considered in selecting a tightening torque; also the effects of the use of lubricants. Additional data includes tables of tensile stress areas and tables of bolt strengths. Write to Bruce Link for this manual.

Aluminum mill products are cataloged in a new 16-page booklet by Peter A. Frasse & Co., Inc., aluminum distributor, Martin Ave., Lyndhurst, N. J. The booklet contains a selection guide of wrought aluminum alloys, table listings of various shapes, weight tables, available mechanical and organic finishes, fabricating services performed and a list of helpful literature published by Reynolds Metals Co. Address your request for this catalog to Bill Stoehs.

"Wyandotte Products for Aluminum Processing" is the title of a 4-page folder produced by Wyandotte Chemicals Corp.'s J. B. Ford Div'n., Wyandotte, Mich. The folder covers etching, cleaning, desmutting, paint stripping, barrel finishing, brightening, paint preparation and deoxidizing. Featured products include Wyandotte Mil-Etch for decorative etching and Wyandotte Aldet, a new non-silicated companion product for cleaning prior to etching. Ask Robert Raine to send you a copy.

Plastic fire brick and ramming mixes are described in a new 8-page brochure published by Plibrico Co., 1800 N. Kingsbury St., Chicago 14. The booklet sets forth the advantages of the various Plibrico refractory products and gives the specifications and packaging data. Photos of case history applications of some Plibrico products are also shown. Tom Barry will respond to your request for this booklet.

Power assembly tools, the tools that speed up many kinds of fastening operations, are described in a data book compiled by Black & Decker Mfg. Co., Towson 4, Md. Scruguns, tapguns and impact wrenches are illustrated in close detail to show the tools' working parts and clarify their methods of operation. Design features that militate in favor of fast, convenient fastening techniques are explained. Selecting the proper tool for the job is also treated. Ask Harvey Porter about this; he's at 695 Pennsylvania Ave. in Towson.

"Bright Dip Hints" is a complete treatise on the position held by the bright dip process in anodizing; it is a 16-page booklet prepared by Virginia-Carolina Chemical Corp., 401 E. Main St., Richmond 8, Va. Appropriate tables accompany this booklet which will be sent by R. C. Long upon request.

Tool and die makers and purchasing agents are being offered a slide-rule price estimator and weight calculator developed by Latrobe Steel Co., Latrobe, Pa. At a glance the user can readily determine weight and prices on the company's high speed steels, die steel and its complete line of regular tool steels. Ask Tom Curtis for this.

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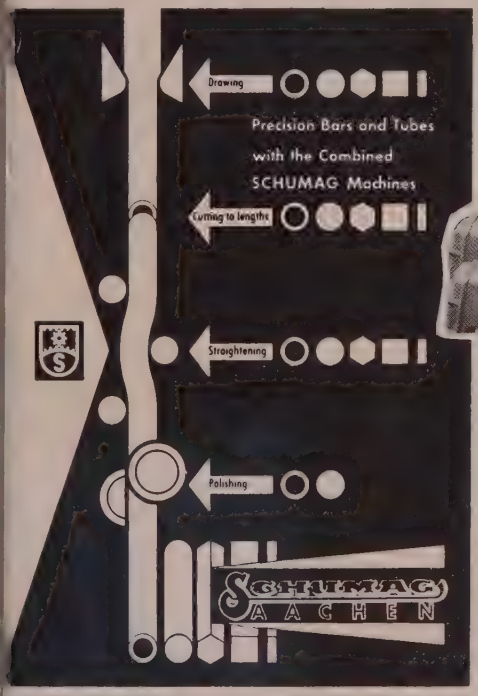

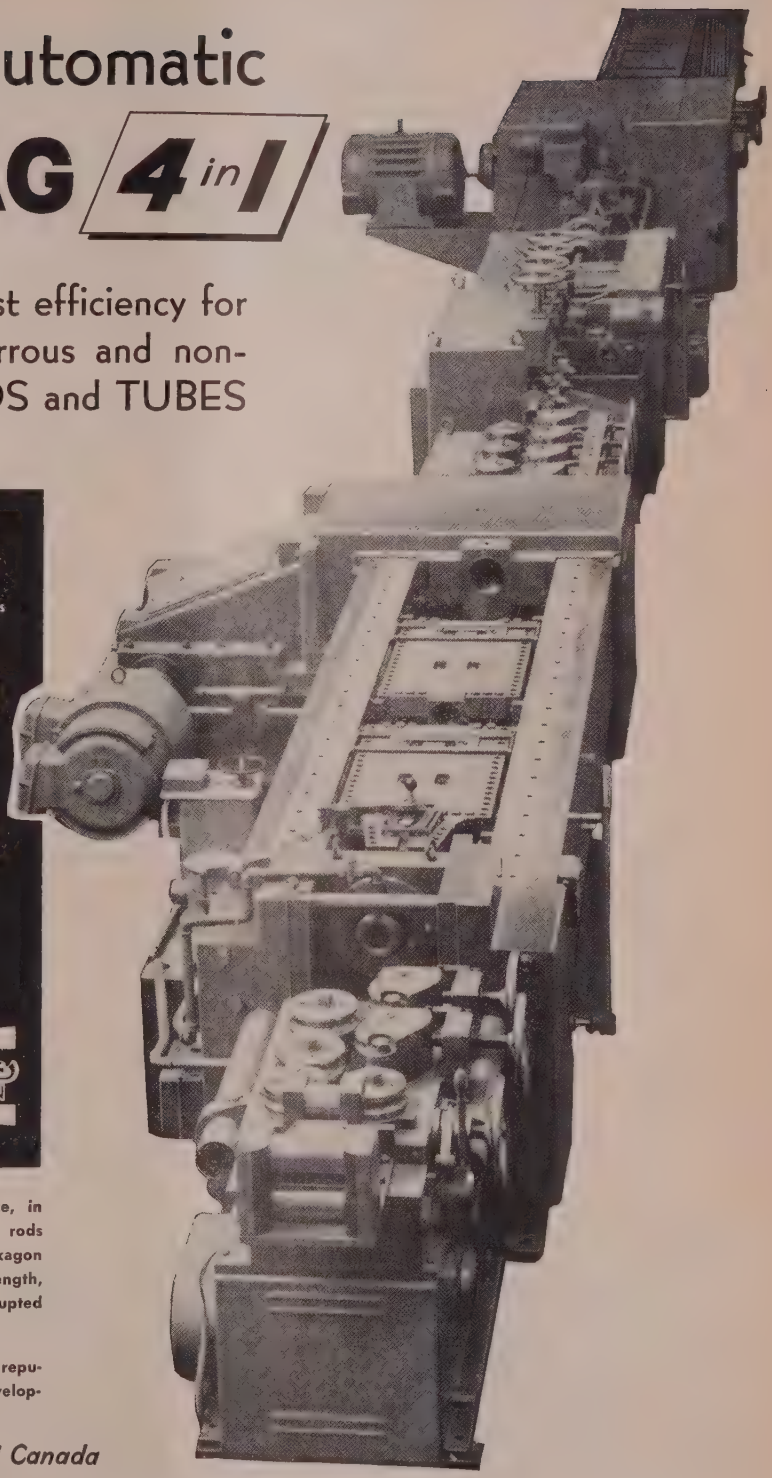

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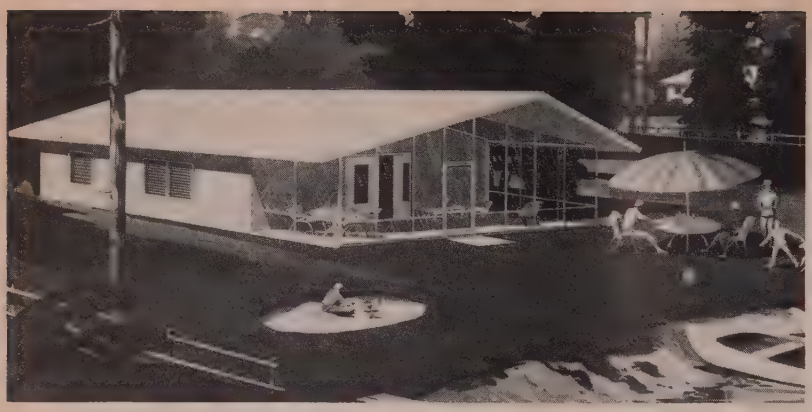

VACATION COTTAGE

by K. B. Rhodie, Associate Editor

RISING personal income, the shorter work week, longer vacations, earlier retirement, improved highways and roads, the cliff dweller's urge to commune with nature—these and other conditions are combining to create a favorable climate for the latest wrinkle in the home building business.

It's the second home—or vacation cottage—and it bears all the earmarks of a lucrative opportunity for the resourceful manufacturer who can anticipate the consumer's wants, come up with slick but functional designs, and establish a merchandising system that not only will reach the prospective buyer but also make it easier for him to realize his wish for a wilderness retreat.

Since the mass market for vacation cottages is in the formative stage, there is still time to avoid the costly bits-and-pieces construction techniques that have hampered the home building business. There is still time to exploit the efficiencies of prefabrication as it is practiced today—and to hasten the necessary trend to true factory fabrication of dwellings.

A handful of enterprising firms are blazing the trail in this direction, and it's no accident that aluminum and plastics figure prominently in their plans. Both materials are eminently amenable to prefabrication.

Aluminum Ideal Because . . .

Aluminum is particularly suited to this new housing product, owing to its proven resistance to weather, its excellent transportability, and the versatility of the extrusion process. Plastics, whether applied to aluminum as colorful and durable finishes, or formed into aluminum-faced load bearing wall panels, completes the formula for factory fabrication of the ideal vacation cottage.

So new is the second home market that sound statistics are scarce. However, some interested observers are making educated guesses. The National Association of Home Builders, for example, says second home starts rose from 75,000 three years ago to 100,000 last year. A survey by *House and Home* magazine confirms these figures.

The best indication of the type of interest which is being shown in the small cottages comes from the Douglas Fir Plywood Association, Tacoma, Wash. The Association has developed 22 vacation house designs—mostly using plywood, of course—and reports that in 3½ years it has received more than 500,000 requests for plans.

Predictions vary. The National Association of Real Estate Boards expects second home construction to reach 200,000 a year by 1970. But W. E. Difford, executive vice president of the plywood group, says "there's no reason why we can't say 500,000 will be built per year 10 years from now.

"The factors that made this market in the first place are just getting started: Better highways, more access to recreation areas, more income. . . . Another point which hasn't been considered before is the increase in the number of families living in apartments. This is hurting the home building market, but it should help the second-home market, because these people will have more desire to get out of doors than families with nice houses and yards in town."

According to NAHB economist Nathaniel H. Rogg, 10 years ago only one family in a dozen had an annual income which topped $10,000. By 1957 it was one in eight, and by 1970 it will be one in four, says Rogg.

Another important factor is the appeal to status seekers. It's possible, say some sociologists, that the second home will move ahead of the second car as our prime snob symbol.

Still another stimulus will come from security-minded couples who will buy the shell, fix it up over a period of years, use it when they can, rent it when they can't. Finally, the couple will retire to the second home, and either rent or sell the city house, using the money to supplement their retirement cache.

Assuming that these are good enough reasons to expect an active trend toward second home buying, we can now examine the wants of the potential buyer—and how aluminum fits into the picture.

A survey by the Douglas Fir Association revealed that a second home buyer wants economy, easy financing, simple construction, minimum maintenance, adequate sleeping arrangements, expandable emergency quarters, attractive design, proximity to primary home, and durable materials.

This seems to be an almost impossible bundle of requisites, but the creative efforts of some aluminum fabricators can come close to fulfilling them.

Perhaps the best example of a packaged prefabricated vacation cottage is that produced by Panelfab Products, Inc., North Miami, Fla. This firm, headed by Andy Tyree, started making three-wall additions for mobile homes 14 years ago. Eventually the company developed an aluminum stressed skin structural honeycomb sandwich panel and applied it to vacation cottages.

Built Maintenance-free Units

"More than six years ago we built our first weekend cottage of Panelfab construction on a Florida lake," says Andy Tyree, "and since that time we have built many others. These little cottages have been just about as maintenance-free as one could imagine."

Now, Panelfab offers a full range of homes encompassing several models. The largest models—Flamingo (photo above), Falcon, Lark—have a screened-in porch in addtion to the basic unit. Other lines are the Mallard 1, 2 and 3, ranging in area from 124 to 208 square feet; and the Space Age Compacts—Venus, Nike and Saturn.

Basis of Panelfab cottage frameless construction is a load bearing 2-inch thick aluminum honeycomb panel. The core is made of phenolic-impregnated kraft paper formed into honeycomb cells 1-inch wide. Facings are of .025 inch 3003-H14 stucco embossed natural mill finish aluminum.

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Extrusions - Pre-Coated Sheet - Roll Formed Shapes - Coatings - Adhesives
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These modular panels serve three purposes: They form the structural system of the house; and because roll-coated or laminated aluminum sheet is used for facings, provide finished interior and exterior walls.

Panels used for walls have roll formed edges which are raised about ½-inch and turned over on the panels' interior about ¼-inch. These edges, when butted, form channels inside the panels. In final assembly, vinyl drive cleats ¼-inch wide and running the full length of the panels, are slipped over the channels holding modules together and forming wall and roof sections.

Roof edges are roll-formed in the same manner and similarly joined. But roof panel construction differs slightly in that the edges which are ultimately attached to the walls are reinforced with a ⅛-inch thick aluminum plate bonded into a slot cut out of the core.

Panelfab says its construction method offers five advantages: All aluminum construction minimizes maintenance; the cleated panels make the entire structure weatherproof, and eliminate metal-to-metal contact and the attendant condensation problems; insulation is equivalent to that in conventionally insulated structures; and once the panels are in place no painting, insulating or plastering is needed.

A Panelfab house satisfies all the requirements cited earlier. Prices range from less than $1000 to about $5000, depending upon the completeness of the unit purchased. Construction is simple (due to the cleating system used) and fast (a complete Panelfab residence was erected in the Virgin Islands in four days). Maintenance is minimal.

The versatile modular panels permit quick expansion when needed; plenty of room to begin with; attractive design possibilities. Optional panels (solid or with jalousie, awning or picture windows) are available in a wide assortment of exterior and interior finishes. Roofs are cantilevered for added style.

Choice of Finishes

Exterior aluminum sheathing comes with a plain mill natural or stucco embossed finish. Both can be had either roll-coated with a baked-on acrylic or alkyd enamel, or etched and zinc chromated for painting in the field.

Other advantages of the panels are that they come with pre-hung solid or jalousie doors; or with special internal reinforcements or backup material and capped cutouts for heating, air-conditioning or plumbing. Roof panels can also have internal reinforcements, as well as capped cutouts for fixtures, etc.

Honeycomb panels faced with prefinished aluminum sheet are invulnerable to attack by vermin, rodents and fungus; and are more fire-resistant than conventional frame construction because the reflectivity of aluminum sheet delays heat accumulation and each tiny honeycomb cell acts as a fire wall.

The panels have an amazingly high strength-to-weight ratio. On an equal rigidity basis, they weigh one-sixteenth as much as steel, one-tenth as much as aluminum, and one-fifth as much as birch plywood. Government tests have revealed that they can support 10 to 20 times the normal loads required of ordinary house construction.

An important point is that Panelfab cottages are built in accordance with Dade County, Florida, building codes, which are designed with hurricanes in mind. In fact, a portable Panelfab classroom survived last year's Hurricane Donna which struck with winds of over 125 mph and gusts up to 180 mph.

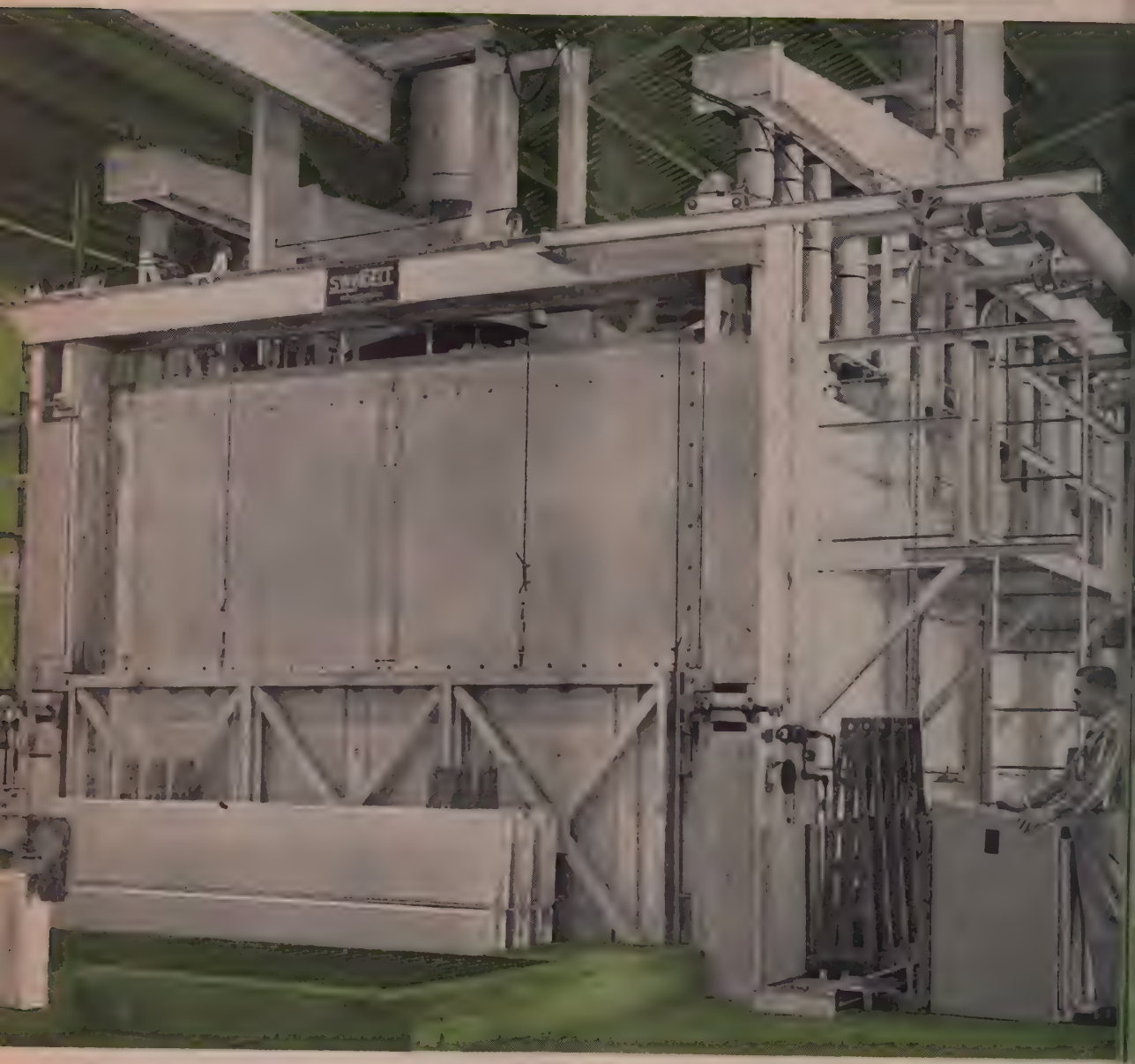
"The classroom was completely undamaged," says Andy Tyree, "though several concrete structures were leveled. This is all the more spectacular, considering the 6-foot cantilevered overhangs of the Panelfab buildings."

Equally impressive is the insulating value of the panels. In resistance to outside temperature, a 3-inch thick panel is more than twice as effective as an 8-inch brick wall; a 12-inch concrete wall; or double strength glass

This is International Structures' entry in the cottage field (above). It can be erected within 75 miles of New York City for under $5,200. At right is the Econo-Cabin, small "second home" being prefabricated and sold by Florida Industries, Inc.

Another

SWINDELL FIRST



Loading end of furnace. Attendant is controlling edge-loading of ingots in 4-place pusher for entry into furnace.

ENGINEERING SERVICE: Swindell-Dressler Corporation provides a complete engineering service for the steel industry in the design and construction of new plants, and modernization of existing facilities. Consultations arranged gladly on request.

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NEW SWINDELL INGOT HEATING AND HOMOGENIZING FURNACE

features edge-loading of product for greatly increased capacity

Designed to handle aluminum ingots 150″ long by 60″ high by 10″ thick, this new Swindell furnace greatly increases ingot heating and homogenizing capacity for Fairmont Aluminum Company, subsidiary of Cerro Corporation, at Fairmont, W. Va.

The furnace has the following features: rapid recirculation—radiant tube heating—alloy panel construction for 1200°F heating—pushbutton operation.

This installation is one more illustration of Swindell-Dressler's ability to tailor furnace design to the customer's particular production schedules. Other Swindell furnaces for the aluminum industry include melting, holding, slab reheating, annealing (with or without inert atmosphere) and heat treating.

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Hydraulic unloader automatically placing ingot from exit end of furnace on roll table for delivery to hot mill.

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windows. It is 30% better than a typical frame house with stucco outside and metal lath and plaster inside. The heat transfer coefficient (U-value) of a 3-inch panel is .210, compared with .50 for 8-inch brick, .36 for 12-inch brick, and .57 for 12-inch concrete.

Core Cut Carefully

The real secret of the panel's superior structural performance is the core. Great care is taken in preparing it for application to the aluminum facings. After the core material is treated, a special Panelfab-designed machine planes it to a uniform thickness with less than 0.005-inch variation. Such close tolerance brings each cell into perfect contact with the aluminum skins. The core is then expanded and bonded to the skins, under heat and pressure, with a neoprene-phenolic-resin reaction type adhesive.

Erecting a Panelfab home is simple. The site is prepared just as for any structure. The flooring is usually a concrete slab, though other types may be used. From then on, the builder need only follow the instruction manual which is keyed to markings on component cartons.

First erection step is to bolt the extruded base channels to the floor. Then wall and roof sections are assembled and the wall secured to the base. A special extrusion is used to turn corners. It can be seen on the outside of the building, but not on the inside.

Once walls are in place the roof is put on. Angular extrusions are placed at wall-roof intersections on both sides of the wall. These angles are secured with Huck blind rivets driven into the roof's reinforcing plate. Angular extrusions are also riveted in place to form the ridge cap at the apex of the roof. Next, aluminum trim is snapped over the angles to conceal them.

This completes the shell of the house. Next step is to place interior wall partitions and complete plumbing, wiring, etc.

The important information a prospective second home buyer should know is what he is getting for his money; what the extras are.

Package Also Includes . . .

Panelfab provides anchor bolts, nuts and washers; roof and wall paneling; exterior pre-fit doors with locks, butts, threshold and door stop; interior doors; choice of windows with mechanical operators and screens; and exterior and interior natural aluminum trim.

For an extra charge, Panelfab will provide kitchen and bathroom equipment and shelving. Not included in the package are inside and outside plumbing, electrical fixtures, the flooring, and site preparation.

In comparing Panelfab construction to plywood for instance, you can see the many advantages of aluminum and the modular honeycomb panel. Conventional wood homes must have a skeleton erected first. Then the wall and roof must be nailed in place, painted on the outside, insulated on the inside and finally, some sort of finished interior wall and a ceiling must be put up. From then on, the outside must be painted frequently.

The modular aluminum panels, on the other hand, are finished inside and out, insulated and load bearing. Maintenance is minimal.

Other firms making headway with aluminum cottages are also basing design on prefabricated insulated panels. However, some of them offer interesting differences from Panelfab construction.

International Structures Inc., New York, manufactures a 4½-room cottage of prefabricated panels and will erect it anywhere within a 75 mile radius of New York for $5,188. It will be available at similar prices elsewhere in the country within the next year, says International. The cottages can be assembled in one day, and easily disassembled and moved to another location.

Panels used in the International bungalow have embossed, baked enamel aluminum exterior face, a 2 or 3-inch core of foamed polystyrene insulation, and an interior facing of tempered hardboard that can be painted, wallpapered or finished in any other conventional manner. Panels can be used as curtain walls or as load bearing elements to support the roof.

■ ***Single workman easily carries a sandwich panel while constructing a Florida Industries vacation cottage. Here, an interior wall is being erected to create rooms. Notice the wide use of interlocking extrusions. Wall finish is simulated wood-grain.***

The closed-cellular plastic foam insulation is fire retardant, moisture and termite proof, and will not rot or warp, says International. A 2-inch thickness of this core material is said to have the thermal insulation value of 7 inches of glass fiber.

How They're Assembled

Panels come in two sizes—4 by 8 feet for walls and partitions; 4 by 24 feet for roof sections. For assembly, extruded caps lock together and extruded aluminum battens are riveted to exterior panel seams and sealed with polybutane plastic "putty tape."

Extrusions are supplied by Olin Mathieson Chemical Corp., New York. The hardboard interior seams are battened with tape, spackled and finished. If the structure is to be disassembled, plastic plugs in each batten rivet are merely drilled out.

The completed cottage measures 22 feet 4½ inches by 23 feet 4½ inches, offering a total floor space of 525 square feet. The living room is 14 by 14½ feet, each bedroom is 10 feet square and has a large closet, the bath is 5 by 7 feet, and the kitchen-dining area is 7 by 8 feet. Ceilings are 8 feet high.

International's summer cottage is one of the most complete units a consumer can find. It is erected on a concrete slab foundation with all necessary wiring and plumbing, and includes birch and formica kitchen cabinets. The occupants need only buy a stove and refrigerator.

Special Electrical Fittings

Special electrical switches and outlets were designed to be mounted on the hardboard interior and are connected by armored conductor wire led through channels in the foam insulation. The floor is covered with asphalt tile cemented to the concrete slab. Aluminum door jambs and hinges, trim, and windows (sliding, jalousie or casement) were designed and manufactured by Quaker State Metals Co., Lancaster Pa., to fit the specifications of the modular system. Quaker State also supplies the aluminum for exterior panel facings.

The modular system is versatile; is being used to construct three and four bedroom cottages; has been used in building a 12-room luxury home in the Virgin Islands, a medium-priced residence in Washington, D.C., and in a U.S. Army recruiting office in Brooklyn.

(Continued on page 38)

PMD . . . and the Direct Chill casting method

FOR CONTROLLED CASTING OF NON-FERROUS BILLETS

The direct chill method of casting has practically eliminated all of the objectionable defects that are present in most static castings. Because of the controls available to vary the casting conditions, billets cast by this method are particularly sound and free from segregation, porosity, and inclusions. Grain size and structure can be controlled or varied for different applications.

Direct chill casting is accomplished by pouring molten metal into an open end, water cooled mold that is closed at the bottom by a movable block. As the metal solidifies sufficiently to form a skin, the bottom block is lowered at a controlled rate and the direct chill casting is in process. A wide variety of shapes and forms is possible to cast in bar lengths replacing individual castings, resulting in considerable savings in machining and fewer rejects because of casting flaws.

Permanent Mold Die Company is a pioneer in the direct chill casting process. Through the research facilities of PMD, better casting methods are constantly being devised . . . methods that insure higher quality castings at lower costs. And remember, a Permanent Mold Die Co. engineer is available to anyone having die casting or tooling problems.

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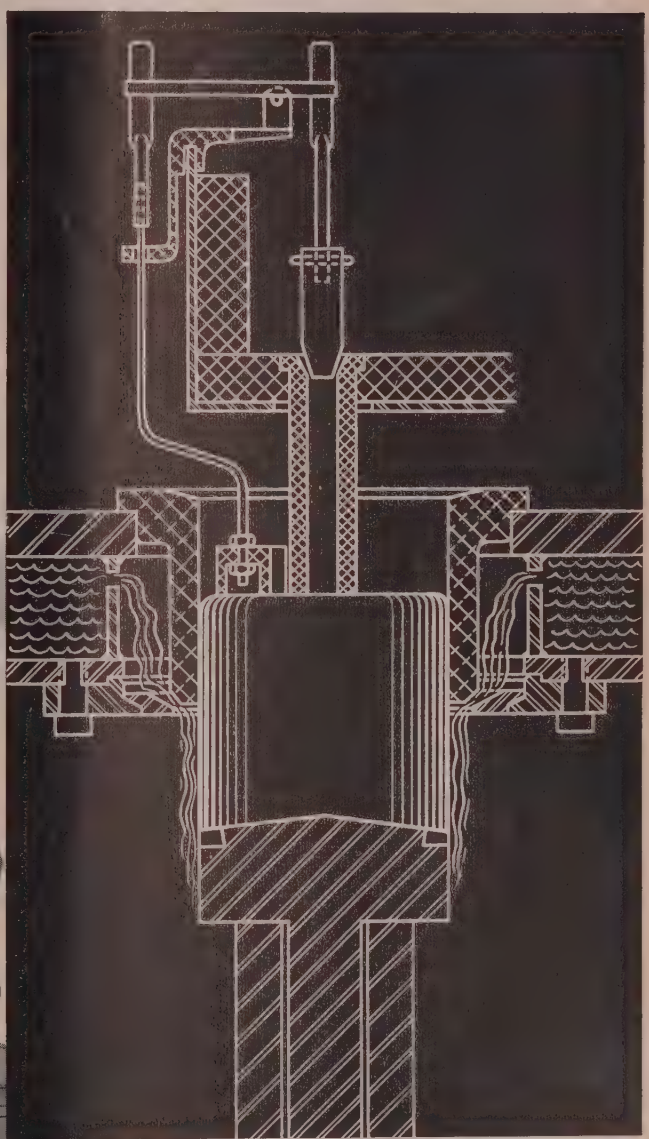

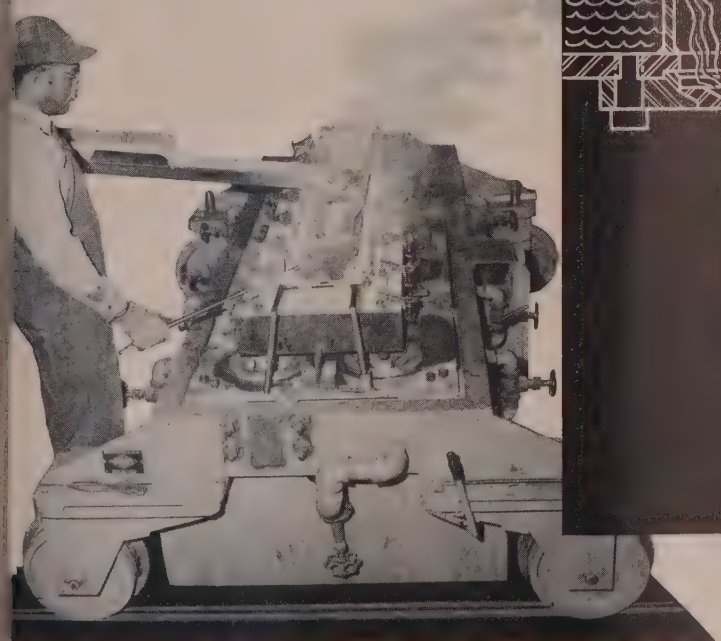

PERMANENT MOLD DIE COMPANY

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The recruiting office required no poured foundation. It was raised 18 inches off the ground on large beams sealed into concrete blocks and anchored to the city sidewalk. Laminated panels form the booth's floor. The aluminum is, of course, on the outside, and the hardboard inside is tiled.

Color Craft Panels are used to make Econo-Cabin and Carefree Retreat, the vacation cottage entrees of Florida Industries Inc., Tampa, Fla. The panels have a 1½-inch thick styrofoam core sandwiched between two sheets of prepainted or stucco embossed aluminum. Modules are capped with extrusions which lock panels together to form walls.

"A man moderately handy with tools, plus a friend who needn't be handy with tools at all, can easily set up either cottage in five days," claims John Liner, vice president of Florida Industries.

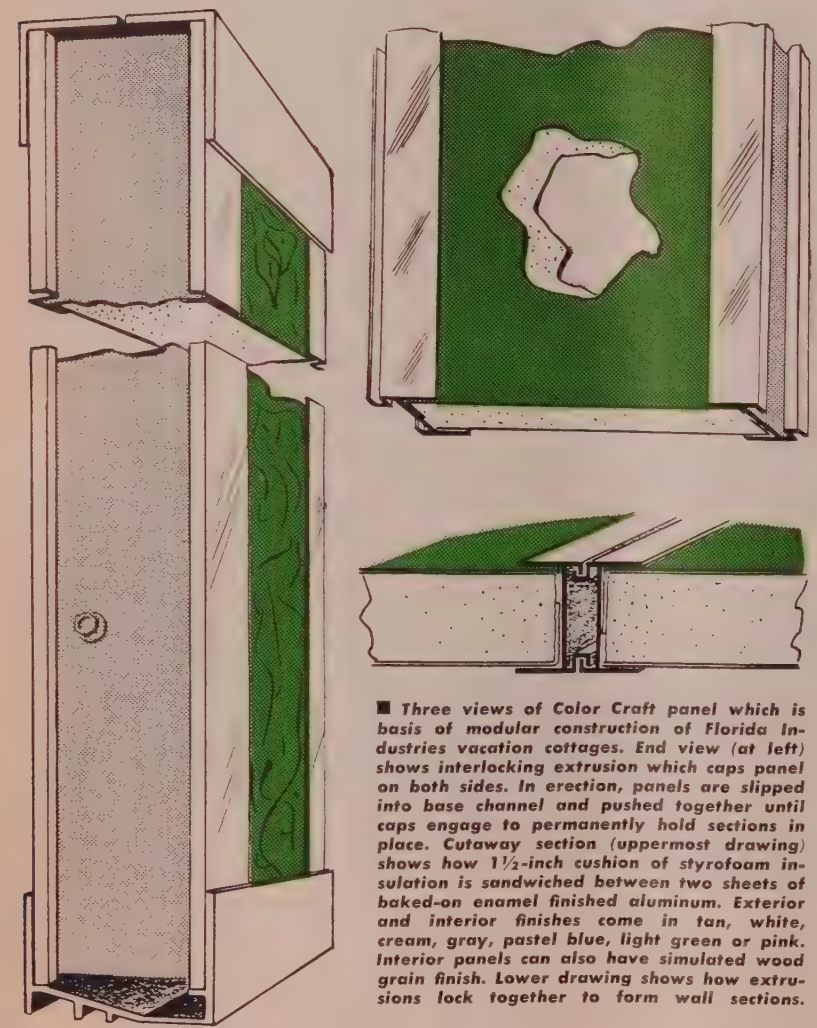
The Econo-Cabin measures 12 by 28 feet, and consists of a general living area, a bath and storage room, and an outside stoop. It sells for approximately $2920, the package including parts for outside and inside walls, doors, windows, screens and channels, and a baked-enamel aluminum roof. The unit is expandable.

The Carefree Retreat is larger—32 by 20 feet. It costs $3973, the final cabin including a bedroom area, living room, kitchen, bath, closet and 12 by 20 foot screen room.

Two Workers . . . One Week

After a concrete slab is poured and the plumbing roughed in, it should take a couple of workers less than a week to erect either cabin. There are about 30 steps involved, the easiest of which are erecting the walls and roof. Anchoring the channels and determining window, door and trim placement take a little more time.

The exterior colors available on panels include tan, pink, white, gray, cream, pastel blue and light green. Interior finishes include the same colors, as well as simulated woodgrain.



■ *Three views of Color Craft panel which is basis of modular construction of Florida Industries vacation cottages. End view (at left) shows interlocking extrusion which caps panel on both sides. In erection, panels are slipped into base channel and pushed together until caps engage to permanently hold sections in place. Cutaway section (uppermost drawing) shows how 1½-inch cushion of styrofoam insulation is sandwiched between two sheets of baked-on enamel finished aluminum. Exterior and interior finishes come in tan, white, cream, gray, pastel blue, light green or pink. Interior panels can also have simulated wood grain finish. Lower drawing shows how extrusions lock together to form wall sections.*

Florida Industries reports that two additional cottages—the Holiday and the Lakeview—are being prepared for its line. Though they will be available soon, there is no production schedule as yet.

Provincia is a small structure that can be used as a fishing cabin as well as a tool house, parking lot office, roadside stand, etc. It is made of 3 foot square, pre-painted aluminum modular panels by Heeney Aluminum Structures, San Francisco 12.

The Provincia can be assembled in 16 sizes in one to three hours. Main advantage of the unit is that it requires no foundation. Instead, it has its own floor and stands on legs which can be adjusted so the cabin is level.

A 12 by 12 foot cabin costs about $1290, which is approximately $8.90 per square foot. Without flooring, the total cost drops to a little more than $80.

Attractive cottage design is listed as one of the prime concerns of a second home buyer. Aluminum can readily meet this requisite because of the possibilities offered through the use of extrusions, and especially because of the durable sparkling colors which can be applied to the metal.

To date, most of the models created in aluminum, as well as other building materials, have conventional though attractive lines. But from now on you can expect to see designers following two distinct styling paths.

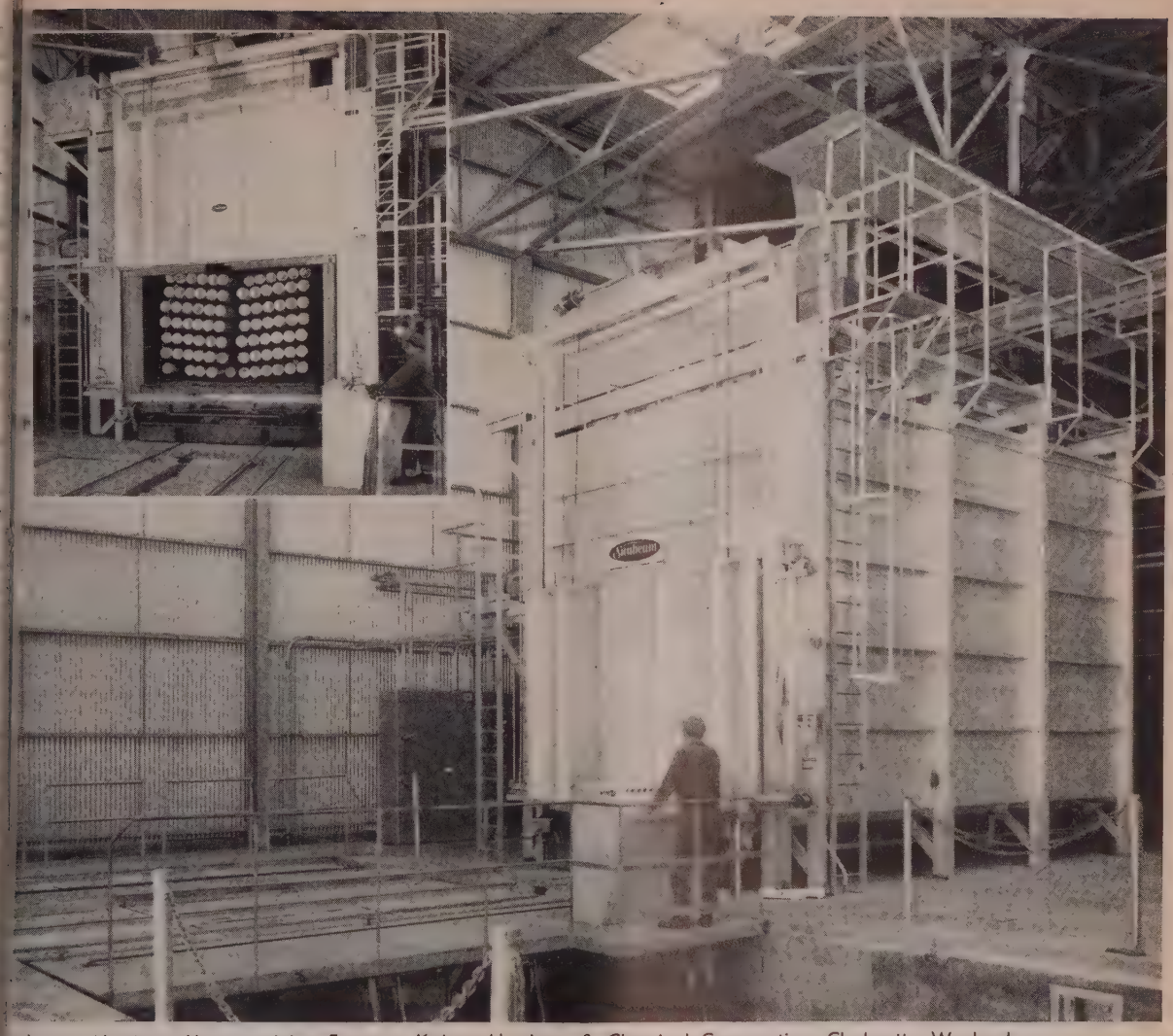
One path will lead toward making appealing cottages for the conservative market: Couples planning to retire to their second home; families making $6000 to $10,000 a year. Resale value of the dwelling is important to this group and they might balk at designs "too far out," and which may become passe and hard to sell in future years.

The Elegant; The Radical

The second path will be a more flamboyant one leading toward a market made up of higher income families, and perhaps bachelors, who aren't expected to be too conservative or too concerned with reselling the property.

Futuristic styling concepts utilizing aluminum, and which offer good possibilities as high-priced second homes are mostly in experimental stages right now. Best examples of such work are the designs of Kaiser Aluminum & Chemical Co., Oakland, Calif., which uses a mobile home as the basic unit, and George Nelson and Co., New York, which uses a 12-foot square modular cage as the basic unit.

The Kaiser designs try to increase the livability of mobile homes by using detachable and movable rooms and roofs, folding patios, full ceiling-to-floor windows, and movable walls and



nbeam Aluminum Homogenizing Furnace, Kaiser Aluminum & Chemical Corporation, Chalmette Works, La. set, charge view shows loaded furnace car inside furnace.

New *Sunbeam* furnace helps Kaiser meet expanding demand for Aluminum

Kaiser Aluminum & Chemical Corporation recently added this new Sunbeam heat processing furnace to help meet the growing demand for high quality Kaiser Aluminum.

Installed at Kaiser Aluminum's Chalmette Works, La., the furnace is divided into three zones of control. It homogenizes aluminum billet quickly and uniformly.

Among the furnace equipment's unusual features is a special transfer car system which brings the billet to and from the furnace car for easy loading and unloading operations. Other equipment built and supplied by Sunbeam includes a pre-wired control panel and a power panel.

What about your expansion plans? Kaiser Aluminum's new homogenizing furnace is an example of Sunbeam's leadership in building furnaces to supply a company's expansion needs. Why not let us help you meet the expanding demand for your aluminum products. Write or phone Sunbeam Equipment Corporation, 196 Mercer Street, Meadville, Pennsylvania.

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screens which provide freedom of space.

Franklin Q. Hershey, Kaiser industrial design manager, says the designs are practical and were developed only after extensive consultation with mobile home manufacturers.

The mobile home additions are not in production, but Kaiser has prepared some scale models which indicate generous use of aluminum and glass. Sheathing would be of prepainted aluminum, and vaulted roofs would be fabricated from pre-formed sheets and insulating material.

One design incorporates wings which pivot 180 degrees after the mobile home reaches its site so as to form a more usable living area, or porch and private bedroom patios. To move the trailer, the wing is swung back into place.

Other styling developments include laminated roofs with pebble or stucco textures, patio covers and supporting panels which fold into the mobile home body when not in use, pitched roof lines, and adjustable outdoor screening which can enclose private gardens.

Mobile homes by themselves are expensive, and with the additions Kaiser is proposing the cost will increase substantially. But for those who can afford the luxury it could be a perfect second home because of its completeness and movability.

George Nelson originally started out to develop residences which could be made from factory produced components. His plan wasn't to be stylish, but to prove his premise that walls, roofs, etc., produced under factory conditions, would be more efficient and less expensive than those built in the field in conventional manner.

'Building Block' Approach

His most recent experimental scale models are modular in design; promise a builder the economies and speed of mass production. But in addition to these advantages, the modules have a flexibility which could produce original, dramatic, almost radical, custom-designed homes.

Basic parts of the Nelson concept include a structural framework of anodized aluminum and wall panels and roof. When put together the elements form 12 foot square room modules or 4 by 12-foot units used as connectors or room extenders. It is by manipulating these building blocks that custom styling will result.

One of the interesting design features of the modules is their double-walled, dome-shaped roofs made of plastic. Nelson thinks it is feasible to pump a non-staining liquid into th roofs, altering the liquid's level to co trol room lighting.

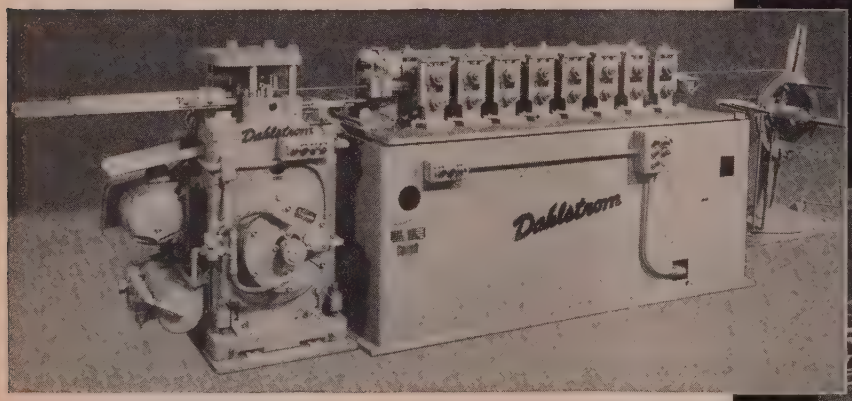
The Nelson modular home h definite possibilities for high-style vacation cottages, though they might b expensive. The cottages could b erected fast, would stand on adjustab legs eliminating a foundation, could b expanded or dismantled and move

The framework will be anodize aluminum, which is weather resistan No wall material has been decided u on, but an aluminum sandwich pan seems ideal. As noted, the panels ca be prefabricated, prefinished, and easil maintained.

The list of aluminum fabricators pr paring an entry for the second hom market is lengthy. But it's obvious fro the examples presented here that th market is not being given a cursor glance or poorly produced products. I stead it is being promoted with though ful, creative ideas; quality homes.

Also, these examples indicate that huge outlet is developing for precoate aluminum sheet, extrusions, roll forme shapes, roll coating finishes, adhesive special and standard fasteners, equip ment to produce and apply all thes cottage components; consumer durabl to equip completed cabins.

COMPLETE
ROLL FORMING LINES
BY Dahlstrom



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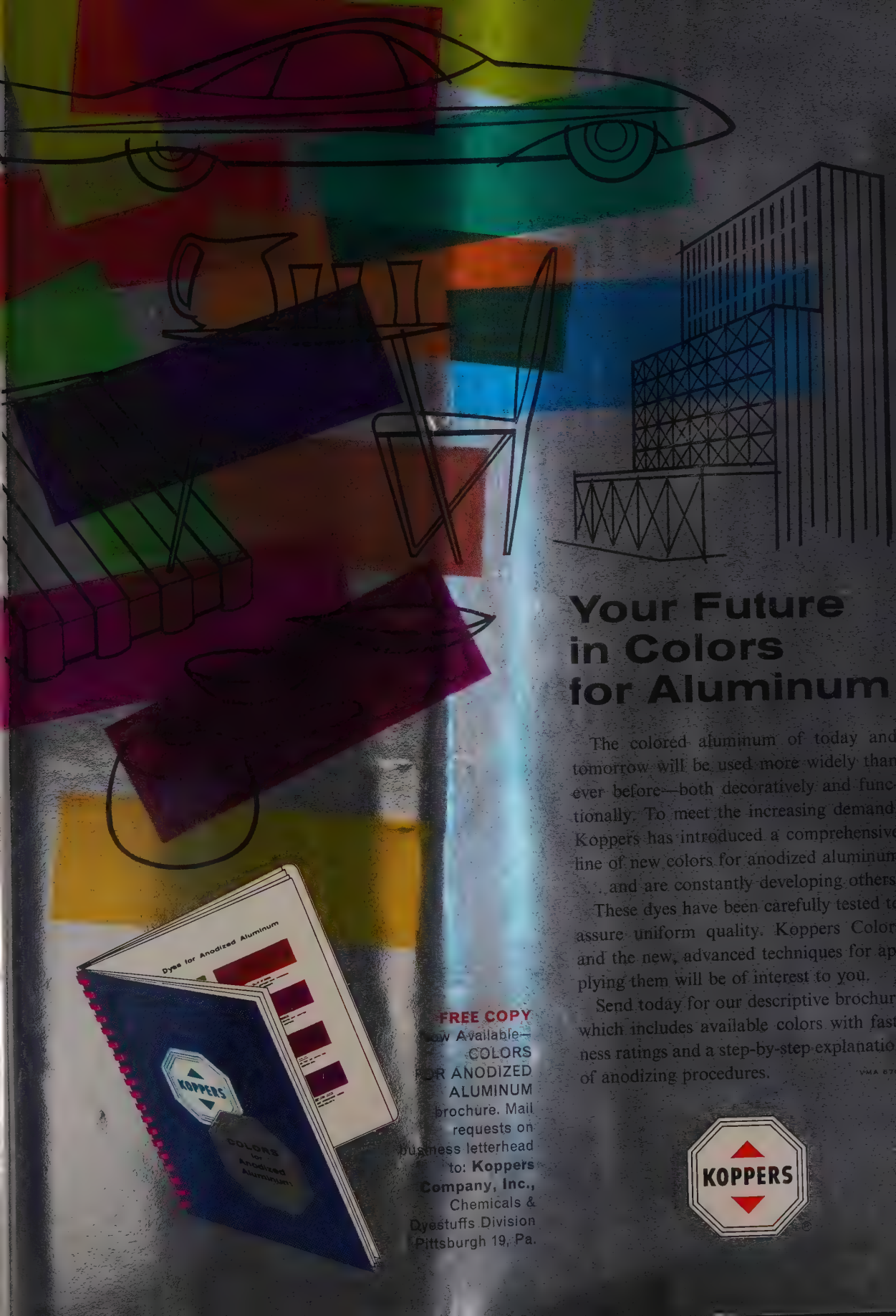

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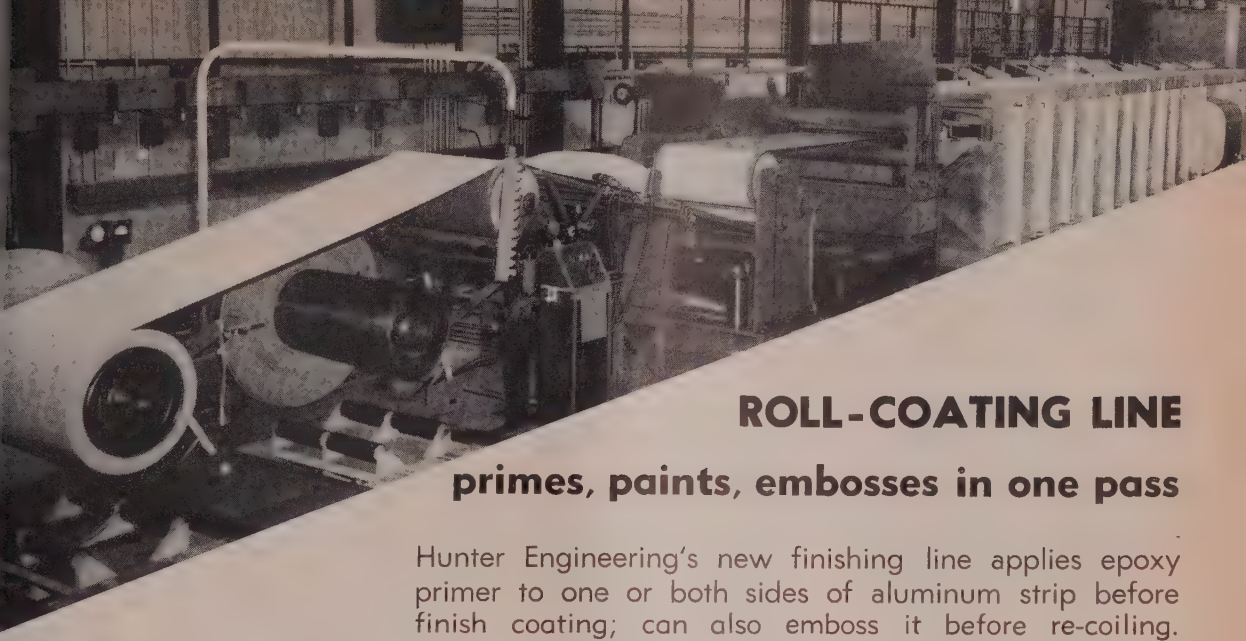

ROLL-COATING LINE

primes, paints, embosses in one pass

Hunter Engineering's new finishing line applies epoxy primer to one or both sides of aluminum strip before finish coating; can also emboss it before re-coiling.

photo above, painted aluminum strip is rewound on one of the tandem mandrels of Hunter's 36-inch roll-coating line.

A NEW continuous strip painting line that applies both a primer d a finish coat to coiled aluminum eet in uninterrupted sequence is now daily commercial operation at the verside, Calif. plant of Hunter En- neering Co. In announcing the new stallation, Dick Brill, executive vice esident, declared:

"This 36-inch paint line incorporates atures which we have worked on and proved for more than 20 years since e Hunter built the first roller coat- g equipment and the first continuous ip painting line in this country. We w feel we're back in our own home ld. We're equipped to do the best o of painting the aluminum industry s ever known," Brill added.

The new line was designed and built Hunter to produce superior quality inted sheet. As defined by Dick Brill, is is sheet with the best corrosion sistance, formability, gloss control d color control. To produce this ality, Hunter says it installed equip- ent with the latest mechanical fea- es and chose the best all-around pre- ating and painting materials.

Hunter says its paint line is the first give two completely cured coats to inch wide strip in one continuous eration. The two coats mean greater rsatility for the finished sheet and tter control of the dry film thickness. The primer coat of epoxy resin rms a corrosion barrier which effec- ely resists cracking and peeling under ere conditions of forming and fabri- ing. With many finishes, corrosion n "creep" under the finish when the ginal barrier has been broken.

The primer used by Hunter is said to adhere so intimately to the metal surface that when the primer film is broken corrosion is restricted to the exposed metal and cannot creep into adjacent areas covered by primer. This feature even protects the exposed edge on metal which is slit after painting.

The constituents of the epoxy primer are so finely ground that one is inclined to comment on the absence of "teeth" in the primer coat which have been considered necessary for mechanical adhesion of the finish coat. But, according to Hunter, the smooth, uniformly thick primer coat bonds the finish coat so intimately that specialists have not been able to mechanically separate the two coats. Also, the finish coat derives uniform color, gloss, and a very smooth surface from the primer.

Finish coats are selected for specific end-product requirements. With conventional one-coat finishes some compromise between corrosion resistance, formability, durability, or surface appearance is necessary, according to Hunter. The use of a primer permits selection of a finish coat with the most desirable properties.

Line Speed: Up to 80 fpm.

The paint line will continuously paint 36-inch wide coiled sheet in gauges from .010 to .051-inch at speeds of up to 80 feet per minute. The sheet travels from tandem payoff reels through a double pass, 30 foot high accumulator tower and into three pretreatment tanks.

The first bath cleans the strip with a detergent wash; the second stage deoxidizes the metal surface; and the third applies a conversion type of pretreatment coat to the metal surface to prepare the surface for the paint.

On the exit side of each tank, squeegee rolls, a clear water rinse, water blast and another set of squeegee rolls remove solution from the strip surface to minimize carry-over and prevent contamination of the succeeding tank.

The strip is dried by a chevron air dryer after leaving the last tank and prior to entering the first paint room. Here, a Hunter roller coating machine applies the epoxy primer to either or both sides of the strip. The paint rolls turn in either direction to give either a forward or reverse coating action.

Primer coat thickness is nominally .0002-inch when cured, but can be varied from .0001-inch to .001-inch and can be controlled within ± .00005-inch.

The primer is cured when the strip is passed through a 60-foot oven in which the temperature is closely controlled between 550° and 650°F., depending on the requirements of the specific finish being applied. Hunter quotes "qualified observers" as saying control of dry film thickness and curing are comparable with lab results.

The primed strip is air cooled as it passes from the primer curing oven to the second paint room where the finish coat is applied. The second machine will paint either one or both sides of the strip, and apply the same or different paint colors on each side of the strip. While the strip is travelling, a change-over from one color to another on the top surface can be made within

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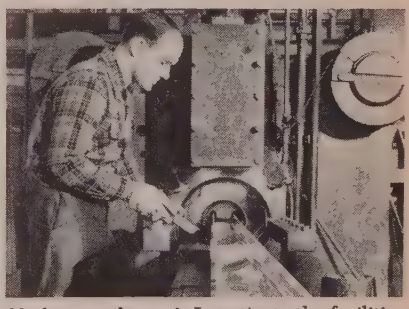

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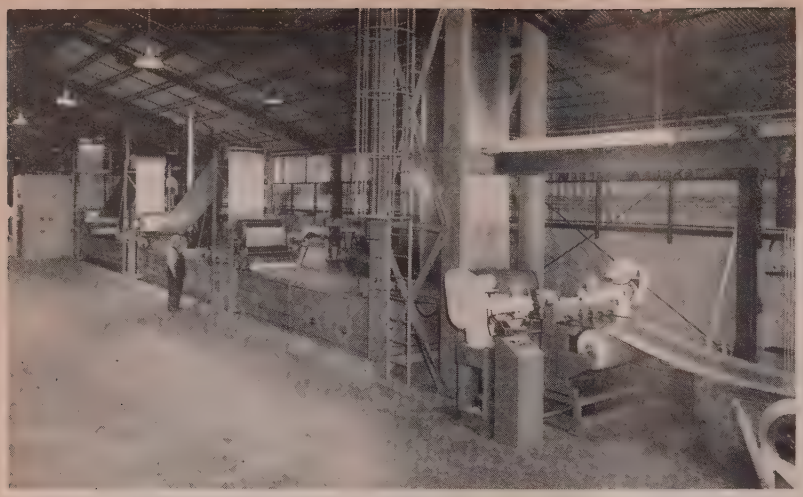


■ *General view of entry end of 36-inch paint line shows aluminum strip passing through pretreatment tanks. Line is 325 feet long from payoff reels to rewind mandrels; holds about 675 feet of strip. Accumulator penetrates roof line.*

a strip length of only about ten feet.

As the strip leaves the second paint machine the finish quality reflects the advantages of priming over single coat painting – close control of film thickness and color uniformity. The finish coat is so tightly bonded to the primer, according to Hunter, that there appears to be a chemical action between the paint and the primer.

Total film thickness of paint and primer is nominally .001-inch, but can be varied from .0003-inch to .002-inch. A tolerance of ±.00005-inch is maintained across the full width of strip.

Hunter selected alkyd melamine enamel as its standard finish for the best all-around performance, but also applies acrylic, vinyl and vinyl organosol finishes to suit different end-use requirements. When strip is painted on one side only, a "wash coat" is applied on the unpainted side to prevent marring the painted surface when the sheet is coiled. Hunter's "trademark" wash coat is metallic green which also enhances product appearance. Other wash coat colors are available.

Painted strip passes through the final 70-foot curing oven, in which temperature is closely controlled between 450° and 550°F., depending upon the requirements of the finish coat. An air blast and a water spray cool the strip on the exit side of the oven. The water is then removed by squeegee rolls and a chevron air dryer.

The finished coils are wound on one of two tandem rewind mandrels and cut to required size by a guillotine shear on the exit side of the air dryer.

Can Emboss Before Re-Coiling

Another special feature is the ability to emboss the painted strip. The embossing stand is located in the line between the exit air dryer and the exit shear. The embossing rolls are brought into mesh on strip to be embossed and separated when the product is to remain plain. Standard diamond and stucco embossing patterns are available at present.

■ *Primer is applied in first paint room (below, left). Strip enters vertically at far left, passes through coater, then to curing oven. In second paint room (right) paint mixer is in foreground; drums feed mixed paint directly to coating machine in background.*

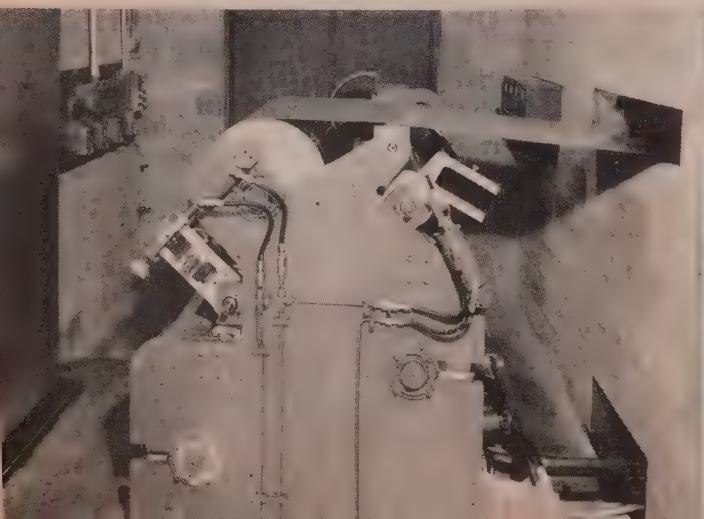
Time and temperature in the curing ovens are critical factors influencing product quality. This means that material must move continuously at a uniform rate. The accumulator at the head of the line can collect enough material to give the operator 90 seconds to shear the tail end of the paid-out coil; shear the front end of the coil to be started from the tandem payoff; and to join the strips together.

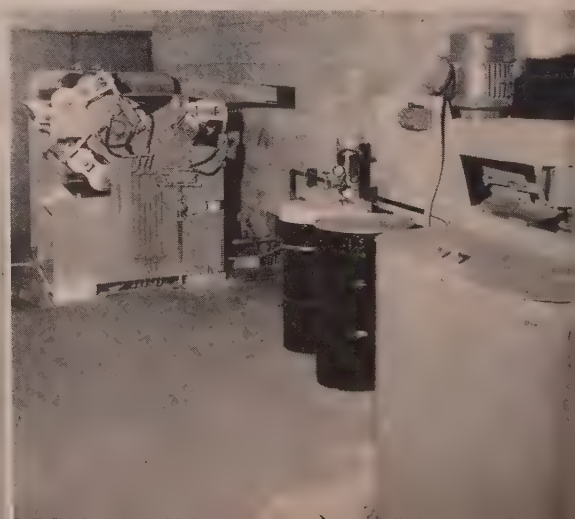
Strips are stitched together by two Bostitch machines, mounted one on each side of the line. Each machine installs a row of stitches halfway across the sheet and then retracts to its starting position clear of the strip edge.

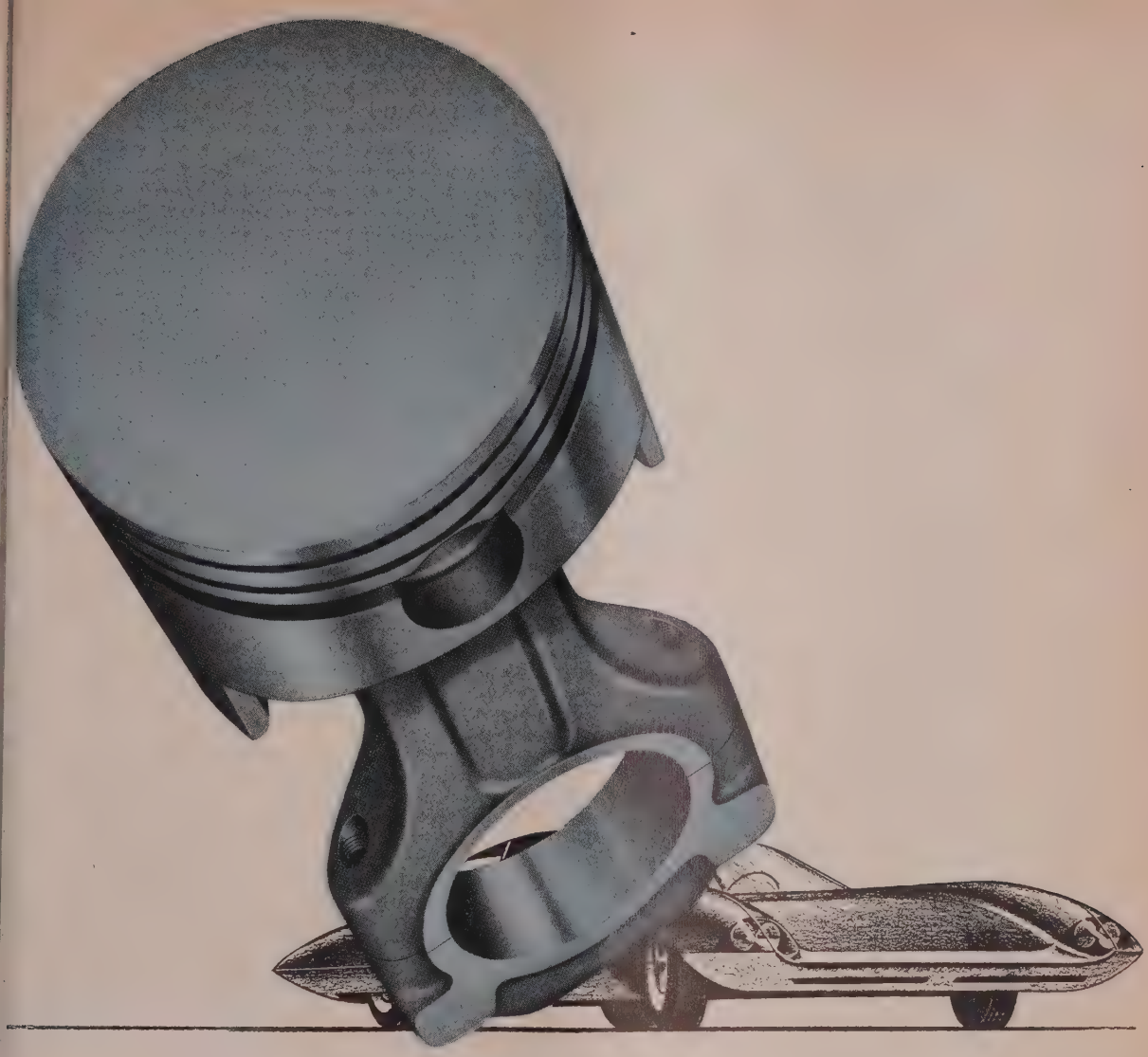
David Mayers, vice president in charge of operations, and Cliff Cramer, chief engineer, note with pride that the design drawings were approved for construction just four months before the line produced good painted strip. Ed Clovis, vice president in charge of sales, is pleased to have this "showcase" paint line as a demonstrator for aluminum fabricators who are in the market for a paint line.

This paint line is the latest in an impressive list of Hunter Engineering's accomplishments in the field of aluminum processing. Other Hunter-developed installations in daily commercial operation at the plant include the Hunter continuous strip casting machines and the aluminum rolling mills (see MM, March '59); the continuous stretcher-leveller line, patented by Hunter; and the many other aluminum processing machines.

"Our experience in fabricating aluminum provides an excellent background for Hunter's special talent for designing and manufacturing machinery," Dick Brill points out. "In building specialized machinery, we can design a complete plant, erect and install the equipment, and train the crews."







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How AC Spark Plug Die Casts Magnesium

Substantial changes in equipment, techniques have been made since General Motors division initiated magnesium die casting operations in early 1950's, as detailed in Magnesium Association Meeting paper.

by S. L. Strong, AC Spark Plug Division, General Motors Corp., Flint, Mich.

DIE CASTING magnesium parts was first initiated at AC Spark Plug in the early 1950's. Until then AC had been die casting functional and ornamental zinc parts, along with a few aluminum fuel pump castings. It was felt that magnesium alloy die cast components offered certain physical and economic advantages that were worthy of investigation.

The development program was initiated with the purchase of a 400-ton cold chamber die casting machine, a gas fired pot furnace, and other equipment needed to produce sample parts. Since this was only an engineering evaluation program, no attempt at a production run was made.

Dies for aluminum parts, and zinc casting dies converted to cold chamber operation, were used to produce test samples of fuel pumps, oil filter bases, vacuum pumps, speedometer frames and ornamental castings. The tests evaluated pressure tightness, strength, wear and corrosion resistance. The castibility of magnesium in relation to sectional thickness and complexity was noted. In many cases, sample assemblies were made up and field tested.

Results of the program indicated that magnesium die castings could be used successfully for many automotive components and accessories. The favorable experience gained during this program also prompted AC to consider a magnesium die cast production setup.

A means of automatically metering molten metal to the shot well of the cold chamber machine would have to be used, or a switch made to the hot chamber unit, because hand ladling small amounts of magnesium caused too much temperature variation. The Dow Chemical Co. had a hot chamber machine, and when machine builders were licensed to produce this unit, AC purchased four of them for its new production setup.

How Hot Chamber Worked

The hot chamber installation first used by AC in 1956 consisted of a 1000-pound capacity gas fired holding pot, connected to the machine furnace by a resistance heated transfer tube approximately 6 feet long. The machine furnace was also heated by resistance coils because it was considered that electric heating provided closer temperature control than did gas.

Two valves, one on each end of the tube, metered metal from the holding pot into the machine furnace whenever the metal level in the furnace became low. This level was controlled by an electric spark gap mechanism that was tied into the valve circuit. Whenever the metal was below a certain level, this controller opened the valves and allowed metal to refill from the holding pot.

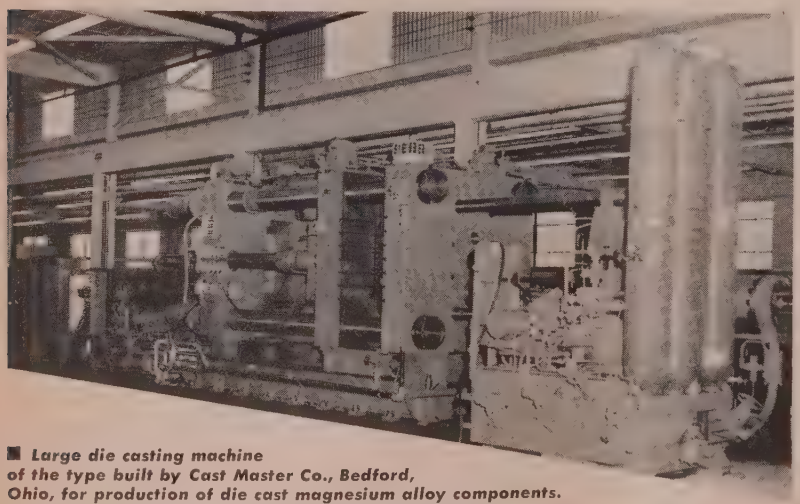
The machine cycle was as follows: The operator closed the safety door which actuated the start switch. After the dies closed and locked the shot cylinder was energized, and the plunger forced metal through the gooseneck and nozzle, into the cavity. After cooling, the die halves opened and the part was ejected. The ejector die was lubricated slightly, the safety door closed, and the cycle repeated.

The top of the holding furnace was completely enclosed, and an SO_2 purge covered the metal surface. Flux was used as a cover in the holding and melting furnaces. Metal was hand ladled from a 2000 pound gas fired melting furnace into the holding furnaces.

The four machines were in production early in 1957, making fuel pump and oil filter valve castings used in conjunction with zinc and aluminum castings on many of the fuel pumps produced at AC. Most of them are cast in 4-cavity dies, with production rates varying from 600 to 1200 shots per shift depending upon the casting. Shot weights vary from ¼ pound to 1½ pounds.

After a few months it was determined that the tooling cost on the hot chamber machines was very high. Replacement of plungers, rings, and sleeves was frequent because of the 1200° F. to which they were continually subjected. Maintaining compression on the metal in the sleeve after a few thousand shots was extremely difficult. Various designs and materials were tested without finding one that was completely satisfactory.

In February, 1958, we tried a cold chamber metering unit designed and built by Dow Chemical. It consisted of a gas fired holding pot with 400-pound capacity. Metal flowed from the pot through a safety valve into a gas heated



■ *Large die casting machine of the type built by Cast Master Co., Bedford, Ohio, for production of die cast magnesium alloy components.*

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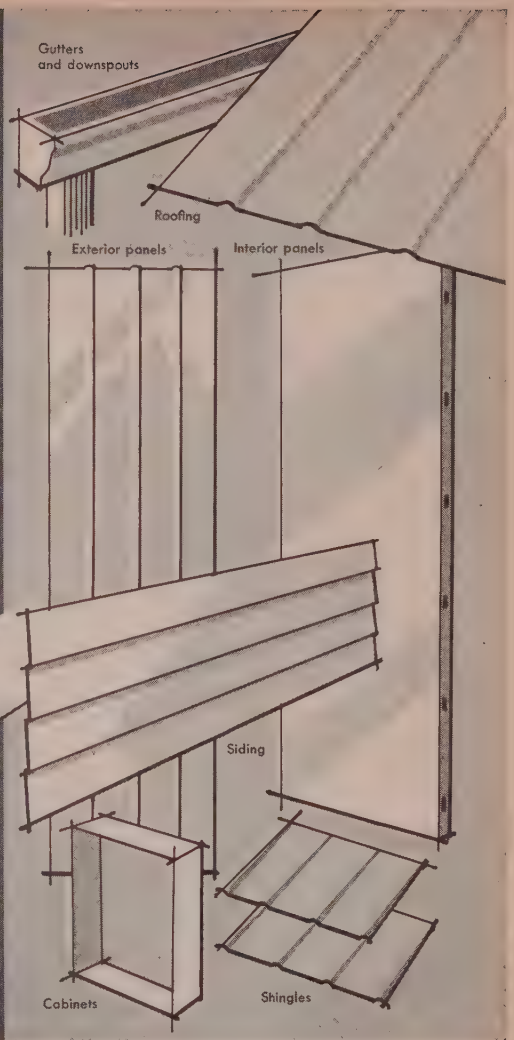
with this shortcut to a finished product



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transfer tube, at the other end of which was the metering valve standpipe.

Because this was a gravity flow system, the metal level in the standpipe was always equal to that in the holding pot. At the bottom of the standpipe was the metering valve, heated by a ring type gas burner. The valve stem ran the length of the standpipe and was connected to the actuating air cylinder mounted at the top.

The standpipe and transfer tube assembly was enclosed in a stainless steel shroud and heated with gas burners. An SO_2 purge protected molten metal at the top and bottom of the standpipe. A cleanout door was provided at the top of the assembly to facilitate removal of dross and scraping down of the interior walls.

When the casting machine called for metal a timer was energized, the metering valve opened, and metal flowed by gravity into the shot well of the machine directly below. When the timed sequence ended the valve closed and the plunger pushed the metal through the sleeve into the die cavity.

This unit was tested for six months and proved to be very satisfactory. Machine downtime, tooling and maintenance costs were considerably less than the hot chamber method. During the test program several design changes were recommended for future units. The pot capacity was increased to 900 pounds and changes were made in the burner and shroud assembly.

In the latter part of 1958, AC purchased five additional units from C. M. Kemp Mfg. Co., Baltimore, which had been licensed by Dow to produce this design. The hot chamber machines were converted to the cold chamber process using this metering unit.

Adopt Vacuum Feed

When used on a single machine the unit was quite satisfactory. But if anything happened to the air cylinder, valve or seat during the operators' absence, the unit would not fail safe. For this reason, it was decided to use another method of feeding metal to the machine in order to produce a completely automatic cycle capable of multiple machine rates.

Two methods of automating this phase of the cycle were considered. The first was induction heating of individual magnesium billets on a 10 to 15 second cycle and feeding the molten alloy through the sleeve. The second employed vacuum to suck the metal through a tube from the furnace into the shot sleeve.

Each method presented certain advantages, but the vacuum system was chosen after a short testing period because of the simplicity of tooling, the fact that no SO_2 purge was necessary, and the process presented a fail safe operation.

The new process was tried out on a 600-ton cold chamber machine. An 80 CFM Kinney vacuum pump was mounted on a vacuum accumulator tank. Three sets of air operated vacuum valves were installed because the exact method of feeding and timing had to be determined in practice.

The first setup had a heavy-walled feed tube clamped to the bottom of the shot sleeve. The vacuum was drawn from the sleeve and die cavity through a hole directly behind the metal intake port. After a short test period, this method of inducing vacuum in the sleeve was discarded because of the tendency to plug the vacuum port with alloy after a few shots.

Low Vacuum Does It

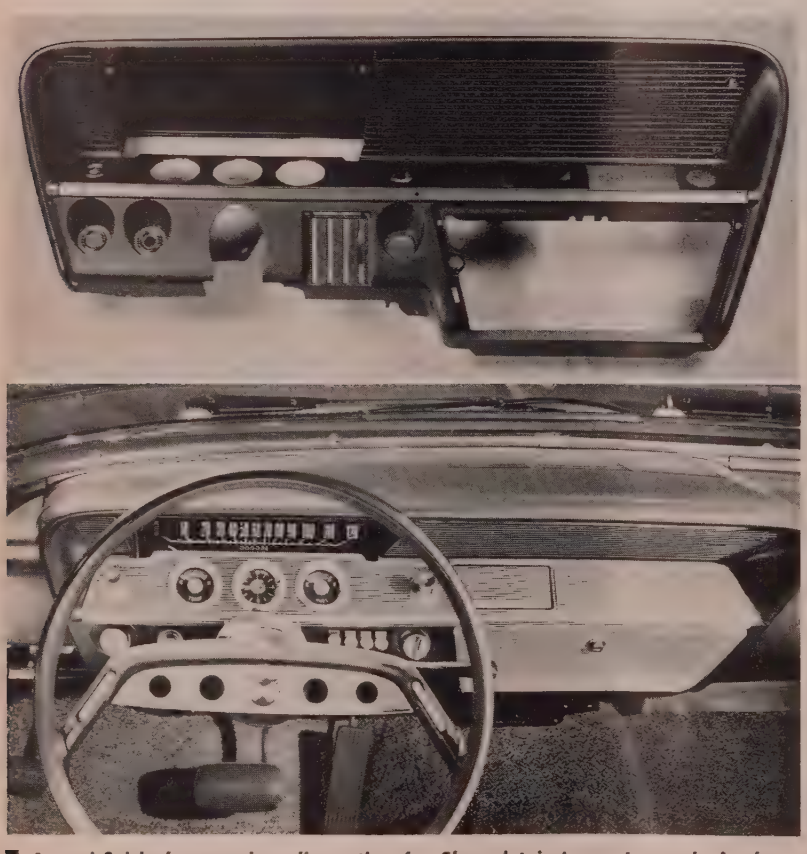
It was found that a very low vacuum (4 to 5 inches of mercury) was all that was necessary to fill the shot sleeve with metal. The vacuum port was shifted to the top of the die, and through use of a "choker block" arrangement the vacuum was induced in the die and shot sleeve.

When the plunger made the shot, the saw toothed channel through which water lines were placed froze all but the very fine particles that were trapped in the filter. This method can be used with moderate velocity plunger speeds. At the higher speeds necessary to run some magnesium castings, the metal did not freeze fast enough and consequently plugged the filter.

Two methods are presently used on the vacuum casting machines. One uses a hydraulic operated pin that closes off the vacuum channel just prior to the shot. The second method is to cut a vacuum channel completely around the die cavity itself, with vents of .005 to .010 inches depth between the cavity and the vacuum channel. Thus, air is exhausted from the cavity and shot sleeve, but the alloy will not flow through the vents when the shot is made.

The present feeding method utilizes a small (½ inch I.D.) diameter, thin walled stainless steel tube, heated by a thermocouple controlled ribbon burner. The tube is clamped to the shot sleeve with an asbestos paper gasket for a seal. In normal operation, the tube is changed at the end of each shift. Used tubes are cleaned in inhibited muriatic acid and water.

AC presently operates eight cold



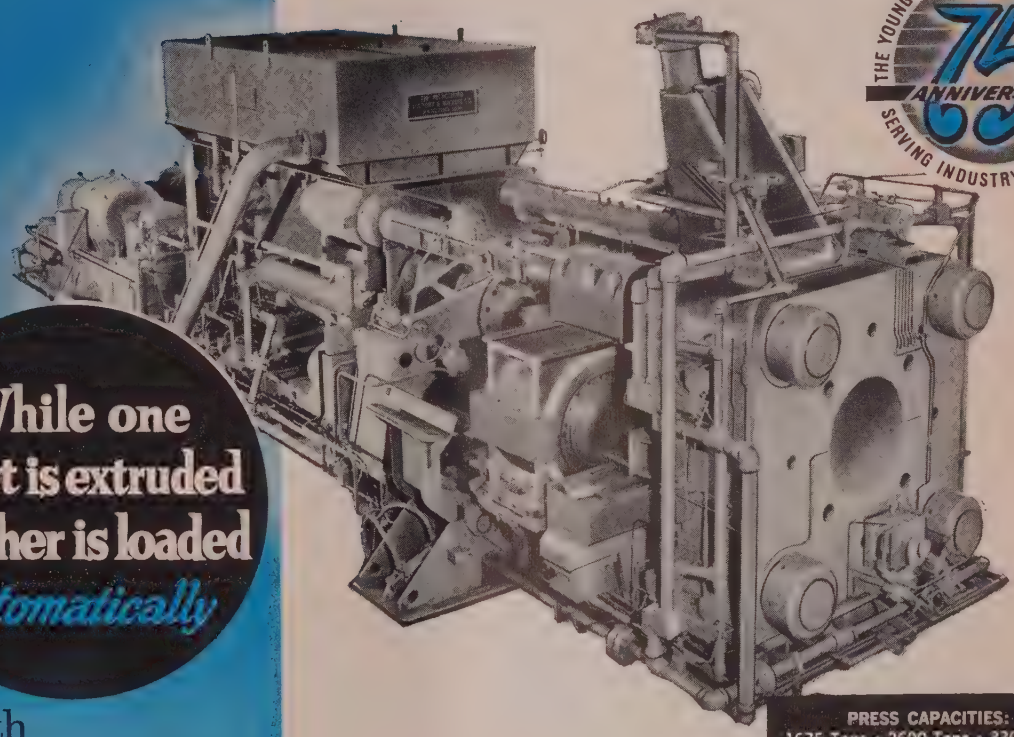
A semi-finished magnesium die casting for Chevrolet instrument console is shown in top photo. Instrument console, installed in Impala, is shown in lower photo. Trimmed casting weighs 4.5 pounds.

Dead Cycle Time Virtually Eliminated by

"YOUNGSTOWN" Presses

with Dual Containers*, Double Die Slide*, Rapid "Rotac" Shear*

THE YOUNGSTOWN FOUNDRY & MACHINE CO. 75th ANNIVERSARY SERVING INDUSTRY SINCE 1886



While one billet is extruded another is loaded *automatically*

PRESS CAPACITIES:
1675 Tons • 2600 Tons • 3300 Tons
or to suit your requirements.

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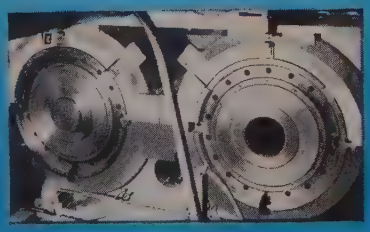

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Flexibility of Die Slide Design permits easy adaptability for extrusion of copper and brass. Auxiliary components enable operator to eject "skulls" from container and to load billets while billets are being extruded.

Double tooling permits cooling without detracting from cycle time.

Properly cooled dies permit higher extrusion speeds. It reduces pickup and produces the ultimate in surface quality.

"Rotac" shears in approximately 2 seconds—¼ the time of conventional butt shear.

Whether your need is for a complete extrusion plant, a new press, auxiliary equipment, or revamping of your present equipment, it will pay you to discuss it with a "YF & M" extrusion engineer.

The Youngstown Foundry & Machine Co.

Youngstown 1, Ohio

*Patent Applied For.

X-10

chamber magnesium die casting machines ranging from 100 tons to 2000 tons locking pressure. Of these machines, five use the metering developed by Dow and two use the vacuum feeding process just described.

Plans call for vacuum feeding on the 2000-ton machine as soon as development warrants its installation. The casting produced on this unit is the Chevrolet instrument console which weighs approximately 4½ pounds after trimming.

400-500 Shots Per Hour

On the small, single cavity automatic machines, cycle speeds of 400 to 500 shots per hour can be reached using the vacuum feeding process. Many parts are being considered for this type of operation because of its flexibility and lower die cost. These cycle rates are extremely important; they provide the heat necessary to produce good magnesium parts continuously.

Numerous problems remain to be solved—and improvements to be made—on this process in order to reach the point where uninterrupted operation can be expected day after day. In its present stage of development, however, the process equals the production rates of other cold chamber feeding methods on a shift basis.

Because of the increased usage of magnesium die castings, a Brown Boveri 450 KW induction furnace has been installed at the plant. This furnace has a melting capacity of 1760 pounds of magnesium alloy per hour in a 1300-pound crucible. It was purchased to replace four gas fired 2000-pound pot type melting furnaces.

Although the crucible diameter demands smaller size scrap than the 2000-pound furnaces, scrap can be melted as fast as it can be charged, provided bridging does not occur. A higher melting rate, lower melt loss, lower flux consumption, ease of sludging, and no weekend operation required are some of the advantages realized from this type of equipment.

On the basis of experience gained to date, magnesium can be rated in comparison with zinc and aluminum die castings as shown in Table 1.

Table 1: Comparison of Die Casting Metals *

***from (1) most favorable to (3) least favorable**

	Zinc	Aluminum	Magnesium
Material costs (by volume)	3	2	1
Die cast labor cost	2	3	1
Die replacement cost	1	3	2
Melting and refining cost	1	2	3
Finishing cost (ornamental castings)	1	2	3
Finishing cost (functional castings)	2	1	3
Machining cost	2	3	1
Shipping cost	3	2	1

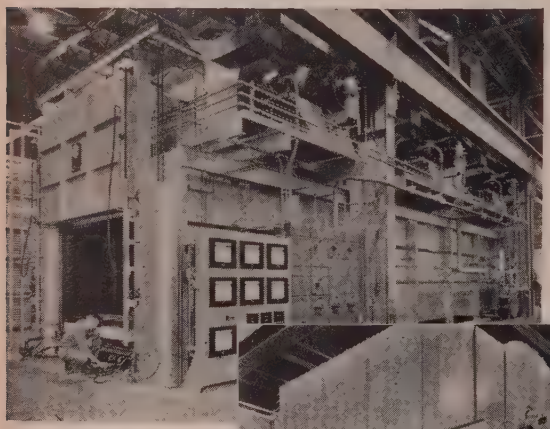
Compiled by A. R. Tinetti

The future of magnesium die casting at AC is promising; present facilities are being expanded, and more complex castings are being contemplated. Batteries of high speed, single cavity automatics will produce functional castings at a multiple machine rate.

These machines will be equipped with static controls which are impervious to the corrosive atmospheres of magnesium fluxes. They will have offset hydraulic units to allow the castings to fall into quench conveyors built into the machine bed. Individual vacuum pumps will supply vacuum to feed metal from holding furnaces into shot sleeves.

These and other developments in magnesium die casting are being undertaken at AC. The results will determine to what extent magnesium castings will be used in future products.

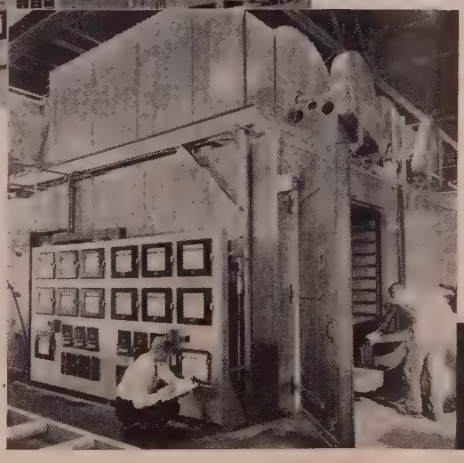
for Unmatched Heating Quality



Radiant tube furnace for annealing aluminum straight tubes up to 50' long, 2" tubing in 48" diameter coils and extrusions of various shapes and lengths.

•

Right—Car type ovens for aging aluminum sheet up to 6' 6" wide x 32' long, tubes up to 6" O.D. x 50' long and extrusions up to 16" cross section x 50' long.



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Engineered to heat your aluminum and magnesium products with closely controlled temperature uniformity and at most efficient production rate.

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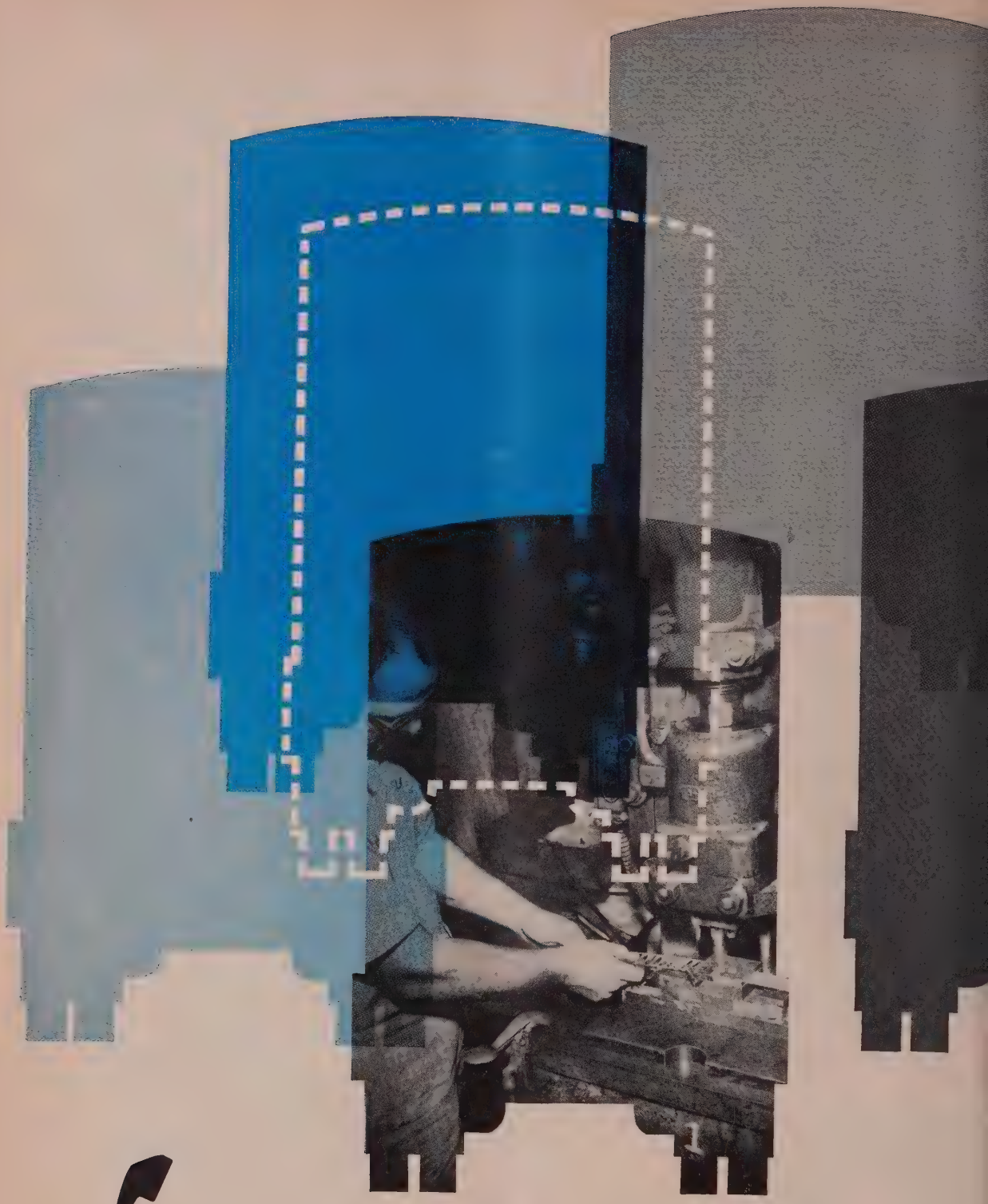

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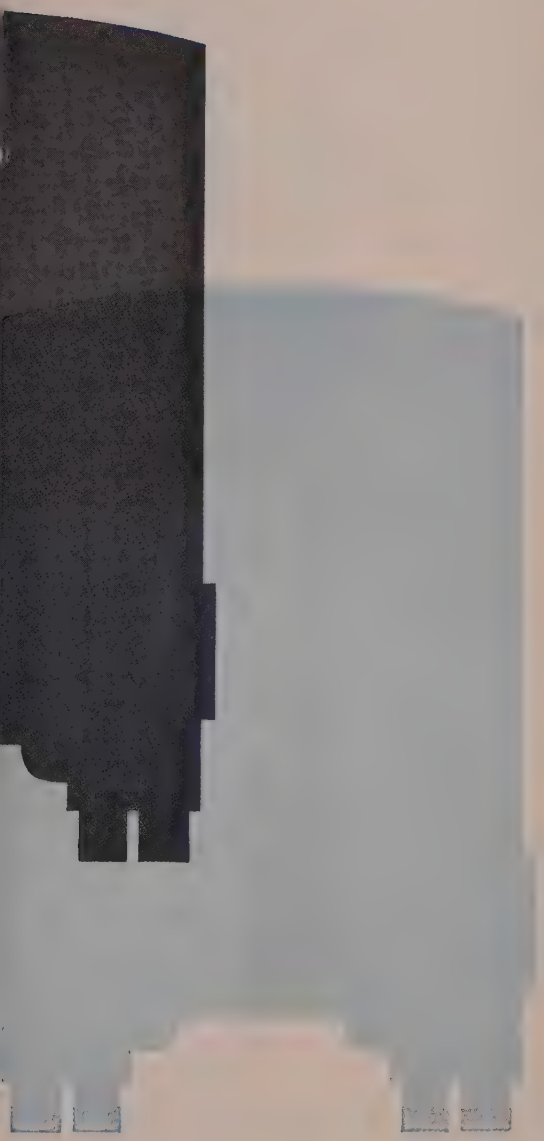
BRIDGEPORT

HINKING ABOUT AN ADDITIONAL SUPPLIER?



...one flexible and fast moving enough to *jump* when jumping is called for in filling your regular or special aluminum sheet needs? That fast-moving flexibility is built into a unique "Direct Line" sales policy that gives Bridgeport salesmen or deskmen *direct* access to our sales and technical management, or our mills. The result is a source for flat and coiled sheet that will excel in the service you can use to advantage – that has the capacity and ability to deliver *all* your requirements dependably whenever you wish.

Aluminum sheet is rolled to "special metals" quality by Bridgeport's modern mills at Warren, Ohio and Riverside, California. Well stocked Bridgeport Metal Service Centers provide quick local service in major metalworking areas nationwide. Bridgeport salesmen and deskmen offer a helpful objective service to metal buyers in the proper selection of aluminum, brass and copper alloys... call Bridgeport Brass Company, Bridgeport 2, Connecticut... offices in principal cities.

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BRIDGEPORT BRASS COMPANY

LUMINUM SHEET

Bridgeport

Excerpts from speech of Robert G. Welch, executive vice president of Steel Service Center Institute, Cleveland, at Chicago meeting of Aluminum Extruders Council.

Rx FOR AILING EXTRUDERS

1) **Develop new markets to engage idle capacity**

2) **Discourage entry of new firms into the business**

3) **Seek closer cooperation with primary producers**

4) **Maintain more complete industry statistics**

5) **Persuade aluminum suppliers and press builders to stop easy credit practices**

THIS voluntary association movement is a precious thing—something to be preserved, nurtured, and expanded. It has contributed to a growing economy and the highest standard of living in the world. It's a basic part of our heritage—one of the essential parts of our free enterprise system. So let's really use it!

Some of you tell me you have a sick industry. Could this be because you haven't used your Council to full advantage?

Walt Gebhart tells me that in 1961, your active members will ship roughly $80 million worth of extrusions and on sales you will earn 2% net after taxes. That is only $1,600,000. Obviously, you can't attract the best men and capital to an industry with such earnings.

What should you earn? Let's look at the average net profits, after taxes, for manufacturers that regularly publish financial reports—based on First National City Bank of New York statistics:

	% Average on Sales	% Average on Net Worth
1954	5.9	12.4
1955	6.7	14.9
1956	6.0	13.9
1957	5.9	12.9
1958	5.2	9.8
1959	5.8	11.6
6-year Average	5.9	12.6

Look at your figures. How do they compare? Apparently there is work to do! Your association was born of crisis during the Korean fracas. Apparently, you're still in a state of crisis after eleven years. Possibly, there is an opportunity to change this. Participate in the positive progressive programs of the Council and expand them further. Maybe some members still think the reason for the Institute's existence is defensive.

Don't believe it. There is so much you can do on a positive basis. You can set high goals and reach them. Your industry and the Council—and there is no difference—can make contributions that can be the envy of other industries.

How? Get the real brilliant men in the industry to go to work—develop industry leadership. Then, define the problems and work together on the solutions. Sounds easy—it's not—it takes work and time and money, but the *rewards*? A sound industry! A progressive industry! A profitable industry! And I mean real profit!

This game is for real stakes. You are dealing in multi-million dollar units. For example, if you just bring your average net profit up to the average of other industries, you would triple your earnings. You can afford most anything to accomplish such a goal. The best salaries. The time of the great men in the field.

By now, I'm sure you are saying, "all this talk is okay, Bob, but how about the nuts and bolts of this problem — what do *we* do?" Naturally, it would be presumptuous of me—an outsider—to attempt a detailed analysis of your problems and then suggest detailed solutions. But, let me make a few broad observations about some of your problems—as they appear to an outsider—and then discuss with you some possible areas toward which you might turn the efforts of this voluntary association.

Your main problem, apparently, centers around too much capacity, and the reverse side of the coin, too little market. Why is this true?

Hasn't it been too easy to get into the business? Then there's technological advancement in such things as new types of billets and better press methods that have upped the capacity of existing presses.

This situation has, of course, caused still other problems. What can be done?

First, wouldn't it be sound to work out a five and then a ten year Council program for the solution of these problems? You won't be able to do it a day or a year. If you approach the major problems on a narrow basis or on an annual basis, the solutions, in opinion, may never come. Considerab more time is required.

Rx Number 1 . . .

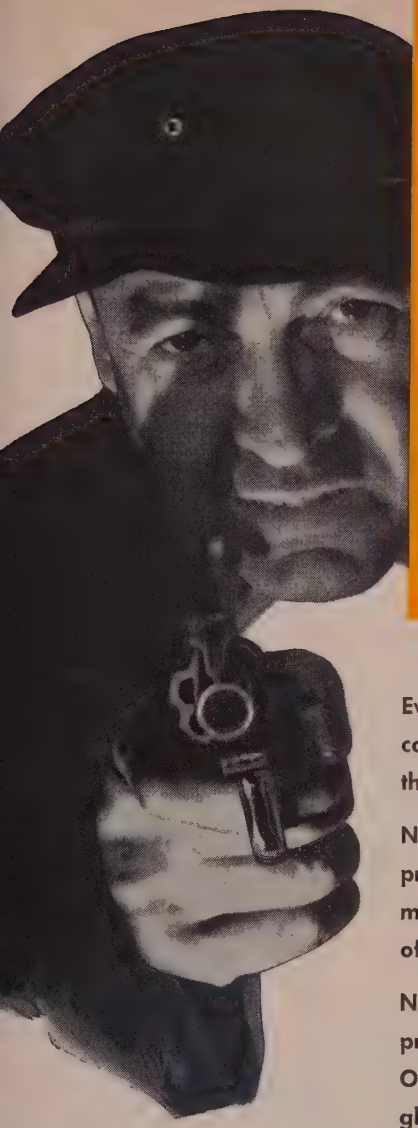
Let's take the basic problem of t much capacity. Obviously the answer a larger market. What can be done your Council? Possibly quite a lot- everyone works together.

Some possible solutions come to mi —and I'm sure you have others. Fir isn't it sound to study the custome needs? Not just his needs for raw e trusions. His needs for parts. His nee for service—such as anodizing, machi ing, bending, blanking, mitering, punc ing, slotting, drilling, forming, asse bling, and packaging. Study his nee for engineering. His need for ideas.

You may be in the business of maki raw extrusions—but that is only t means you are using today to crea value satisfactions for your custome That is what you are really doing. C this basis, what can you do together— a Council to broaden the market? Le brainstorm for a moment!

Consider making a study of the customer needs—the Council might u dertake this. Then as individual co panies, you can determine how y might best supply some of these nee and thereby broaden your industry a individual markets.

You might consider an advertisi and promotional program—explaini to the manufacturers and the consum the advantage of extrusions and yo services. I'm confident the basic pr ducers—your associate members—wou cooperate in such an effort either a joint basis or together with you a coordinated effort. Working with t producers on such a program will al produce a subsidiary benefit — respe and understanding of each other's pro lems. Such a program would grea



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Even the most expensive materials and the finest finishing processes can produce costly rejects if "bargain" compounds have failed to do their job. A finish can be no better than its surface preparation.

Northwest's Cleaning Specialists offer a complete line of top quality products for every "surface readying" requirement, on every type of material. These products have *proved* their dependability over years of rugged production use in the country's finest finishing operations.

Northwest's continuing research and development program keeps our products well ahead of industry's constantly changing requirements. Our fine staff of thoroughly experienced Cleaning Specialists will gladly help you work out the best surface preparation for your product and "stand by" to help you keep it functioning at top efficiency.

Why not save time and rejects by using Northwest's dependable products and services.

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supplement and expand your present individual efforts. Then, tie your individual programs into the industry merchandising plan and benefit still further.

Serious consideration could be given to conducting research on new extrusion uses. Real cooperation and leadership would be required here, for, I imagine, each company would want to support the program only if the new developments could be run on their presses today. Each company would have to support such a program on the basis of the long term benefit that would accrue to them.

Primes Could Help

Another idea might be for you to turn to the prime producers for help on new developments and ideas for customers. The Council could send your industry leaders to the primes on a carefully planned basis to develop such a program.

I am sure many, many ideas have been turned over to you by the primes, but they have remained untested, haven't they?

Isn't it because your company doesn't have the time, money, and staff to develop the idea—do the research—test the idea — work out designs — develop the marketing plans—the sales approach—the merchandising aids? Discuss this idea with the prime producers — you might be amazed at the cooperation you and your Council might get on such a program.

Some of you are looking over the top of your glasses at me with a cynical look. Yes, I know you are saying, "Don't give us that stuff, Bob, all they want to do is steal our accounts."

I don't agree! There are all kinds of areas for cooperation. But, you first have to stop throwing rocks at each other. Very little progress can be made until all segments of the industry start pulling in the same direction and working for the common good.

I'm not smoking opium on this. The charges and counter charges in the public press and the halls of Congress do not accomplish a thing—only harm to you, the prime producers, and the customers. The industry—all segments of it—can't grow and prosper until all possible areas of industry cooperation are explored and put in working order.

Admittedly, each prime producer will supply this assistance on new ideas only to his customers—but the promotion of suggestions of this type can rightfully be done by the Council.

Now, how about the short term for a minute! While you are developing and broadening your market, what can you do today toward developing a satisfactory return on your investment? I understand you have had some good technical training sessions that have contributed toward members' cost reduction. This plan should be expanded, but, is this enough? I'll give you a suggestion, but it takes real business maturity to follow it up.

Have the Council develop detailed statistics on the market—with everyone cooperating. Develop information by counties, by end use, and publish this information regularly — probably by quarters.

Then—and this is the tough one—operate your presses within the industry potential and at a profit. You live in an industry where profit can frequently be improved by operating with less volume in the short term at least. Increasing your sales does not necessarily improve your earnings, particularly if the added shipments are obtained at the expense of price. By reaching outside of your economic operating area, you are wrecking someone else's business — just as he is wrecking yours.

Needs Support, Money

I'm not suggesting in any way division of territories—this is not only illegal, but unsound competitively, and against everything we stand for in this country. I'm just suggesting developing adequate information on the industry so each of you as individuals can have information on which to make sound business decisions. You have a limited program along this line, I understand, but apparently, it hasn't received the support or funds necessary to really make it operate.

Now, for a moment, let's turn to this problem of too many people in the business in relation to today's market.

Somehow, if your return on investment is going to improve, *one trend in your industry must stop*. That trend is the constant introduction of new companies into the industry and the expansion of old ones, *both on an uneconomic basis*. I'm not talking about sound economic expansion, but unsound expansion. This trend—an opportunistic and short-sighted one at best, can, I believe, be handled on a long-term basis.

It seems to me several things might be considered. First, as rapidly as possible, expand your services to fulfill these customer needs I was referring to earlier. Take care of these requirements before new companies come along and start providing such services, plus some of the services you offer today. If you don't do this, expect more competition for it will show up if the customer need is there and unfulfilled.

Incidentally, our industry has done quite a bit in this direction. The trend toward providing more slitting, burning, edging, leveling, coating, etc., and broader product lines has made it ever more difficult for marginal or under-financed people to enter the field. The customer needs are very well provided for.

But, be careful. Don't compete by giving these services away. That can, as you all know, be equally damaging to your company and industry. It is imperative that you earn a reasonable and fair profit on each added service performed.

Secondly, point out to the prime producers and the press and equipment manufacturers that they are contributing to the sickness of your industry with their easy credit. Maybe you talked to them as individuals, but have you used your Council? Again, no collusion intended or intimated should be involved. But, there is nothing wrong in pointing up a problem that is harming an industry's long-term potential.

Easy credit is fine at the birth of an industry, but you have reached maturity now and easy credit has the same effect on an industry as easy money has on a teenager—it contributes to delinquency.

A series of articles on this problem by a Council representative and sound, carefully planned discussions conducted with full consideration of our anti-trust laws with the primes and the press manufacturers would produce outstanding results.

Poor credit policy fosters poor business practices. A man in financial difficulty frequently has no alternative but to operate in desperation. What does he do? He takes on work for an extra shift at break-even levels—or what he thinks are break-even levels. All too often, he actually finds he lost money on the job because he doesn't have the staff to provide adequate information.

Industry's Misfits

This type of man makes off season deals. This type of man, built up by the domestic primes and press manufacturers with long term credit, says he no longer can afford to buy domestic equipment or domestic metal. They lose their customer and he loses vital and necessary services of these suppliers. This is unhealthy, as you so well know. And these are just a few of this many problem practices. Thus, one evil breeds another.

These are just a few of the ideas of which you can work.—There are many more.—That is if you are willing to raise the stature of your Council to a point where it can really do the job.

I repeat—it will take the best men, real leadership, time, and money. It will take persistence and patience. The rewards are worth it—if you are prepared and willing to make the sacrifice and the effort.

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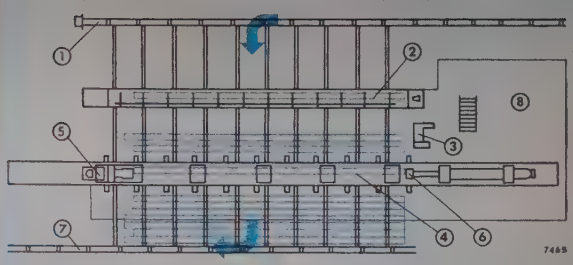


① Approach roller table ② Tube washer ③ Main control desk ④ Tube tester ⑤ Traversible test head with control desk ⑥ Fixed compensating test head ⑦ Run-out roller table ⑧ Pit for pumps and controls

Hydraulic tube testing equipment with automatic controls

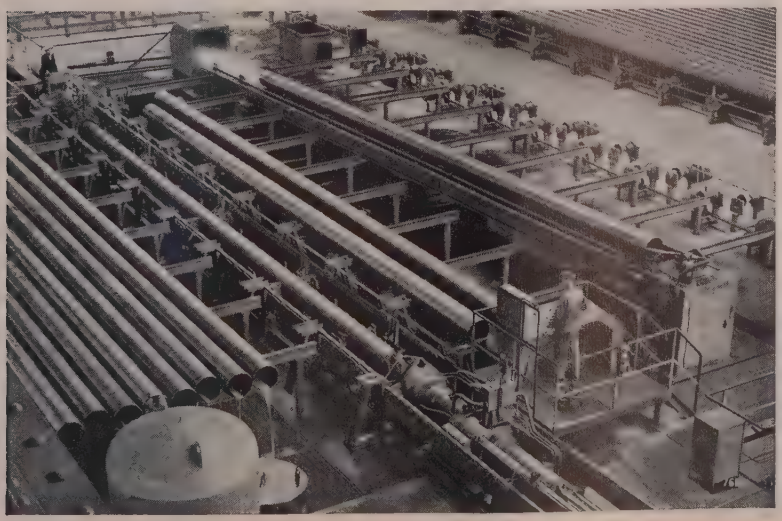
In addition to production equipment for the manufacture of rolled, extruded and welded tubing, SCHLOEMANN has included Tube Testers in its production program for a long time. Details of a new automatically controlled unit for testing tubes up to 16½in. in diameter and 59ft. long are as follows:

Features and advantages

- The design and arrangement of the entire plant and the automatic sequencing – from the loading to discharging of the tube – assure a high output, even when handling tubes of maximum diameter and length.
- The automatic tube washer, arranged in front of the tester, flushes out of the tube all foreign matter, such as mill scale, swarf and weld nuggets. The tube is rotated in a tilted position while the water spray is in action resulting in positive and thorough cleaning.
- A turning device permits welded tubes to be rotated prior to testing, so that the operator has full vision of the weld seam.
- The tube loading, discharging, and clamping devices are independently operated units. This increases operational dependability and simplifies servicing and maintenance.
- The compensating tester-head prevents small-size tubes from buckling before clamping and accommodates all variations in the length of material due to stress without impairing the seal.
- After the tube has been tested, a pull-back device removes it from the fixed tester head, so that it is ready for discharging.

Technical data

Tube size o.d.	min. 6⅝in.
	max. 16½in.
Tube length	min. 20ft.
	max. 59ft.
Testing pressure	1,420 to 3,550 p.s.i.
Clamping power	182 U.S. tons
Capacity per hour	70 to 110 tubes



From the approach roller table the tubes are transferred to the washer; after all foreign matter is removed, the tubes are tested in the press in an automatic sequence. Two men operate the entire plant.

FELLER ENGINEERING COMPANY 1165 Empire Building, Pittsburgh 22, Pa.

Improved Hull Designs Brighten Aluminum's Prospects in Boat Business

Go to most any boat show and you get the impression that fiberglass is the dominant material in pleasure craft. But aluminum is far from out of the picture — particularly with ingenious new designs on the way.

by H. K. Darby, Associate Editor

BOATING continues to catch the fancy of increasing numbers of Americans. Last year it represented a $2.5 billion retail market, including every possible expenditure connected with the activity — boats, motors and related equipment, plus fuel, mooring and dry dock charges, boat repairs, insurance and even club fees.

The 1960 dollar volume for boats, motors and trailers totaled $442 million, according to Guy W. Hughes, executive director of the Outboard Industry Associations. This was 5% below the 1959 dollar volume. The Outboard Boating Club of America, an arm of OIA, estimated that 8,025,000 boats — everything from canoes to the largest cabin cruiser — were used last summer by 40,125,000 Americans, most of them pleasure-bent.

OIA said that 300,000 boats of all types were sold in 1960, compared with 329,000 sold in 1959.

Aluminum continues to wallow in the doldrums as the 1961 boating season gets underway, despite the heightened activity and growth of the market in recent years. (The setback last year followed the slump in general durable goods sales.) Fewer aluminum boats were seen at this year's New York and Chicago Boat Shows than in recent years, while there seemed to be an increase in the number of fiberglass boats in a range of colors that must have set a new high in gaudiness.

The National Boat Show special section in the New York Times offered additional evidence of aluminum's unfavorable position in competition with fiberglass and wood.

Fiberglass Boats Galore

There were 78 mentions of various hull materials in this 24-page section, exclusive of subsequent mentions of the material in a particular advertisement or editorial piece. Fiberglass led with 38 mentions; wood came next with 25 (there were also five mentions of the terms, "lapstrake" and "clinker-built," which are almost invariably associated with wood); and only six for aluminum. There was one story about a line of small boats built of expanded polystyrene, and one reference to steel boats.

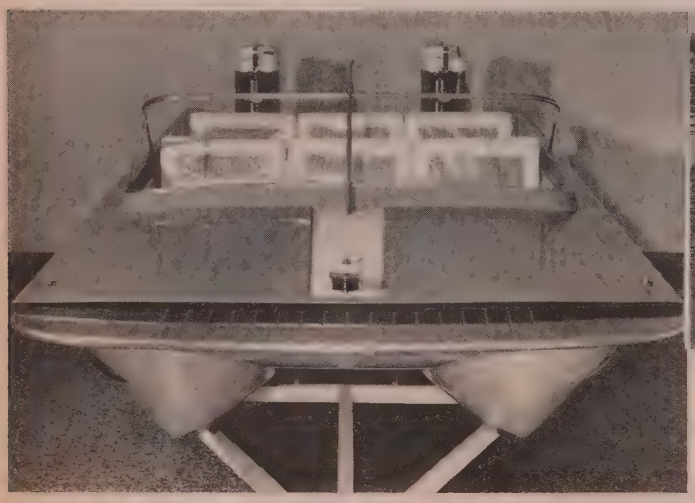
Fiberglass received a particularly favorable plug from a Times staff man. Aluminum had no matching feature. The institutional ad of the Committee of Aluminum Producers carried some weight, but one man's opinion is that this was topped by an ad of approximately the same size by Owens Corning Fiberglas, which got its message across faster and more cleverly.

In the continuing tug-of-war between plastic and aluminum, proponents of either material are capable of digging up favorable statistics.

"No one has accurate figures on how many glass or aluminum boats were sold last year or any other year," an Outboard Industry Associations staff man said. "Sales figures most often are closely guarded secrets, and we've decided that it is best not to compile hull materials statistics."

However, if plastic and wood tended to overshadow aluminum at the shows the primary producers had ample cause for optimism. Four aluminum boats made by three manufacturers and Reynolds Metals Co. were outstanding examples of expert metal boat building and attracted much favorable attention in Chicago. Kaiser Aluminum & Chemical Corp. and Reynolds sponsored three of the boats.

From an aluminum industry view



■ *Whether it be the sleek catamaran sportster (left) built by Valco Boat Div'n of Valley Aluminum Co., or the luxuriously appointed Marinette (above), cabin cruiser built by Aluminum Cruisers, Inc., styling achievement here are evidence enough of boat builders' design capabilities with the light metal. Builders are discovering this*

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point, a star attraction was a prototype all-aluminum family runabout built by McKenzie Boat Co., McKenzie, Tenn. Equally interesting was an all-aluminum prototype catamaran built by Valley Aluminum Co.'s Valco Boat Div'n, Fresno, Calif. Both boats were conceived and developed by Kaiser's Department of Industrial Design as practical applications to show aluminum's versatility in the pleasure boat market.

The runabout is 18 feet, three inches long and features inboard-outboard propulsion which is becoming more popular among boat lovers. It is powered by a 100-hp Interceptor engine with an Eaton Marine Powernaut drive. In test runs the boat hit a top average speed of 38.45 mph over a one-mile salt water course and was judged exceptionally safe by independent marine organizations that conducted the tests. Excellent maneuverability and quiet operation also were noted.

Carl W. Leveau, Kaiser's marine industry sales manager, brought the runabout to the Chicago Boat Show to demonstrate to boat builders who use aluminum the desirable fabricating features of this model.

Originally, he said, the plan was to keep the boat in the basement of McCormick Place so that he could expound on these features without generating inquiries about a model that is not available to dealers and consumers.

"But show people prevailed on us to put it on the floor where it could be seen and appreciated," he said.

McKenzie Boat Co. built the runabout on the multiconic principle, which Leveau said is very well suited to small craft manufacturing economics. Multiconic development of the hull surface is based on the theory that this surface is composed of segments of a multiplicity of cones having adjoining radians in common and whose apices lie somewhere out in space. For purposes of development it doesn't matter where the apices are located.

Why Don't They Use It?

For the boat manufacturer, multiconic hull development offers a handsome hull with a strong appearance of flair to the prow. The surprisingly low manufacturing cost of this technique is the big message that Leveau is anxious to put across to small boat builders.

On a 1000-boat yearly production (five boats a day), the manufacturer can conceivably build each unit for about $2250. This yearly production would require 548,000 pounds of aluminum sheet, and 152,000 pounds of extrusions — 700,000 pounds total.

Seven hundred pounds of aluminum sheet and extrusions, enough for one boat, would cost approximately $350. Balance of the materials and equipment for one boat — from the Eaton Powernaut drive to the deck hardware and trim — amounts to an additional $1400.

A fair retail price is thought to be $3895, although variables such as labor costs in one region compared with others, costs of raw materials shipment, and others could influence the list price.

The runabout's tooling cost is comparatively low at $65,000. This covers the cost of two press brakes, a router with tools and table, large shear, welding and painting equipment and auxiliary machines.

The all-welded catamaran weighs 2100 pounds complete with twin 80 hp outboard motors. It has an 8-foot beam, 32-inch freeboard, and 21-inch transom height. It attained speeds of more than 50 mph during test runs.

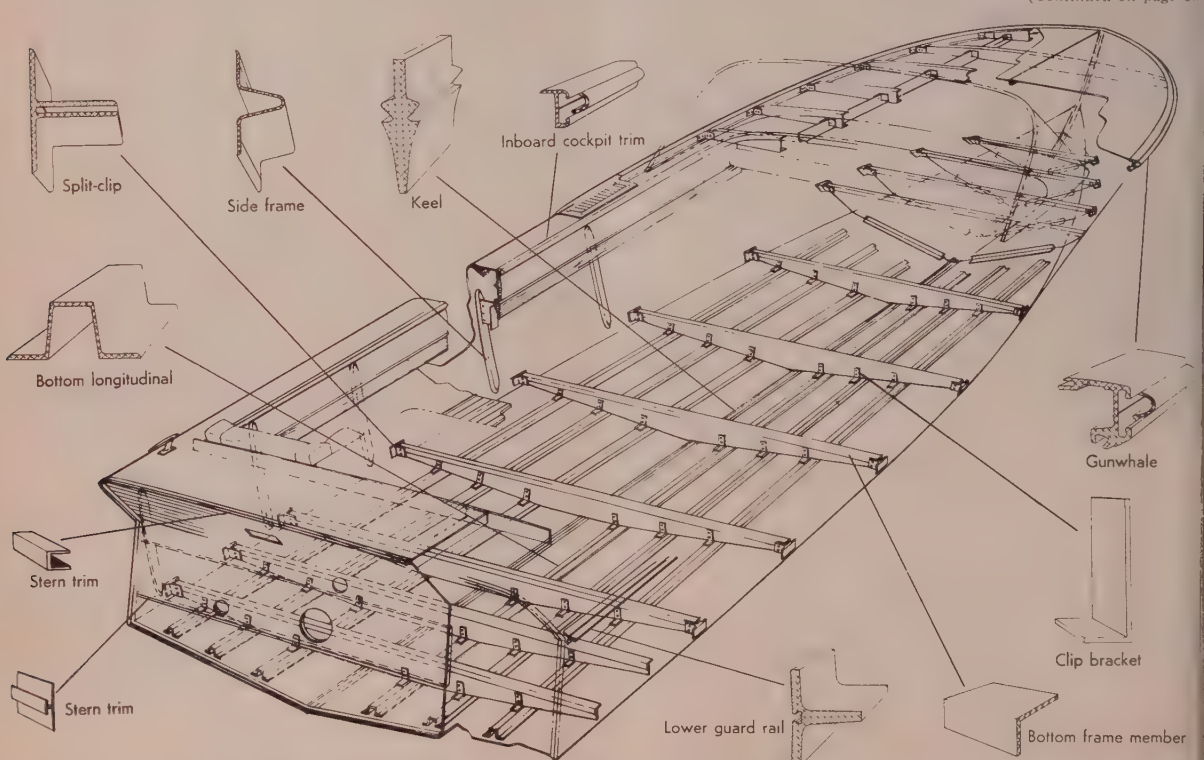
Both boats are constructed of 5052 alloy, a time-proven marine material.

Leveau reported that Valco Boat Div'n plans to produce the catamaran because of its excellent reception at the shows.

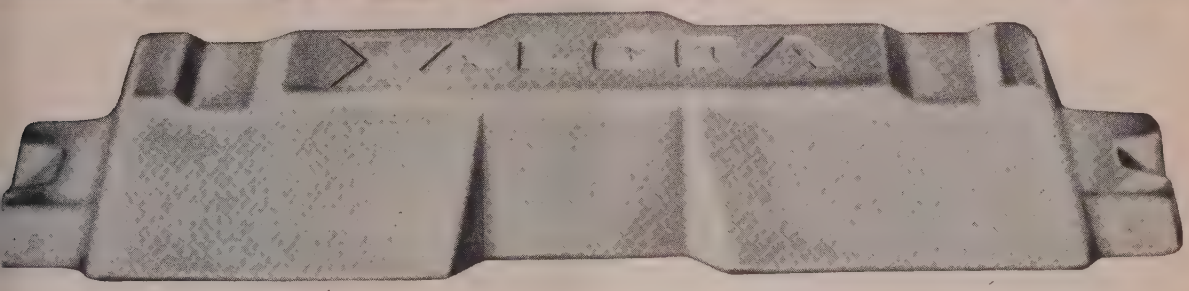
Aluminum Cruisers, Inc., Louisville, Ky., introduced its 1961 Marinette Express Cruiser at the Chicago Show. Length has been increased this year to 30 feet with a 9-foot, 2-inch beam.

"The Marinette offers all aluminum construction utilizing a special alloy that is not only corrosion resistant, but is also 30 to 40% stronger than the common marine alloys," said George C.

(Continued on page 66)



The KX-919-1 18-foot aluminum runabout is an experimental unit built by McKenzie Boat Co. to Kaiser Aluminum specifications. This drawing shows the importance of aluminum extrusions in the design. Approximately 700 pounds of aluminum extrusions, sheet and plate would be used in each boat. The model created considerable interest at the Chicago Boat Show.



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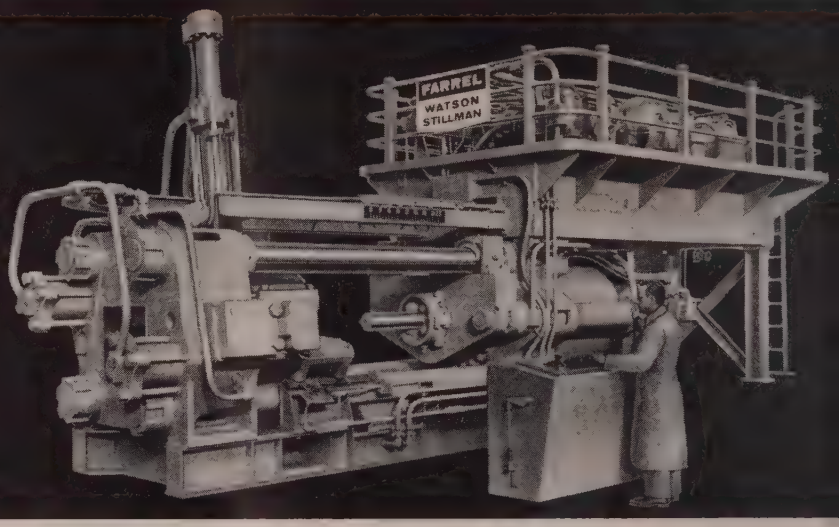
ALCOA ALUMINUM
INGOT

1550-ton long-stroke, oil hydraulic, self-contained aluminum extrusion press. This machine will extrude round billets with dimensions of 7" in diameter and 26" long. Equipped with an alloy forged-steel double die slide, automatic bridge-die cycle and a separate high-pressure container sealing system.



5 REASONS WHY
more and more extruders ar

The demand for Farrel Watson-Stillman extrusion presses and stretchers has continued at a high level. Not only are stock presses sold before completion, other machines — such as those illustrated — have also been in demand.

There are five good reasons for this continuing activity:

1. PRESS DESIGNS

These are modern presses, designed by specialists in hydraulic equipment with a century of experience to draw upon. In addition to their well-known rugged construction, the machines incorporate many outstanding features, which make them economical to operate, and high in production speed and efficiency.

2. BROAD SELECTIVITY

Both self-contained and specially designed aluminum extrusion presses are available in capacities from 600 to 5000 tons. Detwisting and straight-pull stretchers are built in standard sizes from 15 to 200 tons. Special sizes built to order. The company is also prepared to supply all necessary auxiliary equipment, such as billet heaters, die heaters, aging ovens and conveyors.

3. QUALITY CONTROL

An unusual degree of quality control is maintained — from initial casting to final testing — through a coordinated manufacturing procedure that draws on the experience and facilities of the entire Farrel organization. Presses are assembled and tested under dry-run conditions before shipment. Customers may inspect their equipment during manufacture and final testing.

4. INSTALLATION AND INSTRUCTION

A Watson-Stillman engineer supervises the final installation and start up of the press, and instructs company personnel in all phases of press operation.

5. COMPLETE PLANT LAYOUTS

Watson-Stillman is prepared to engineer complete installations. This service includes the preparation of plans for efficient location of all units and the supply of all related equipment.

Ask to see a Farrel representative for a discussion of your extrusion objectives.

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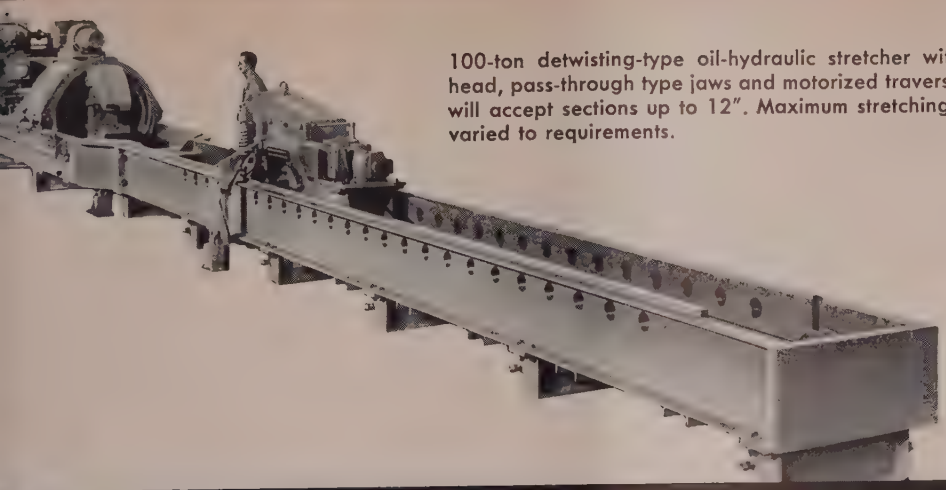
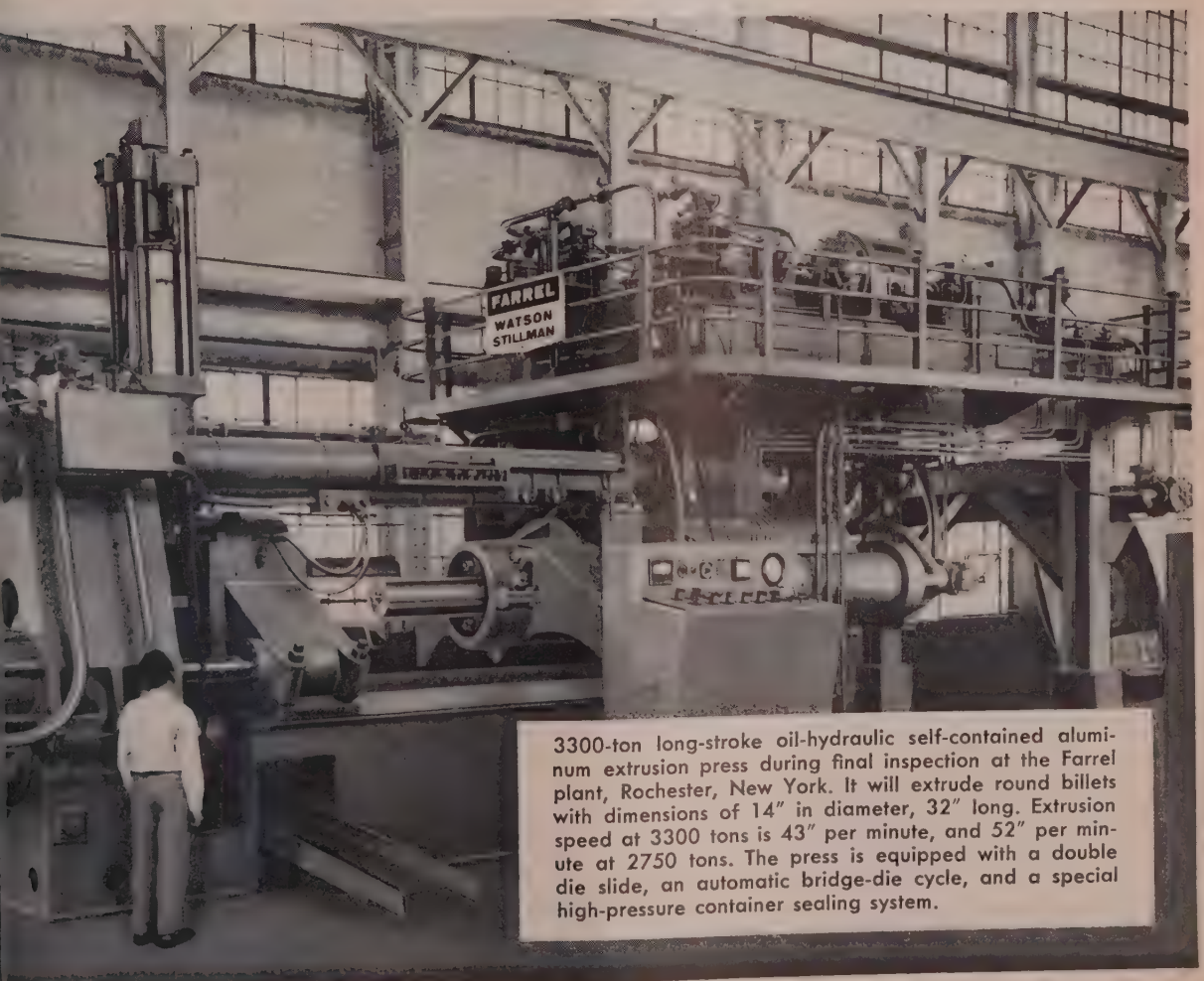


100-ton detwisting-type oil-hydraulic stretcher with motor-driven head, pass-through type jaws and motorized traverse. Jaw opening will accept sections up to 12". Maximum stretching length may be varied to requirements.

pecifying Farrel Watson-Stillman



3300-ton long-stroke oil-hydraulic self-contained aluminum extrusion press during final inspection at the Farrel plant, Rochester, New York. It will extrude round billets with dimensions of 14" in diameter, 32" long. Extrusion speed at 3300 tons is 43" per minute, and 52" per minute at 2750 tons. The press is equipped with a double die slide, an automatic bridge-die cycle, and a special high-pressure container sealing system.

■ *This view of the KX919-1 runabout shows a few of its more interesting features. The angled transom, so designed to keep engine exhaust fumes out of the boat, is gold anodized aluminum. Gracefully turned roll formed gunwhales caused many Chicago Boat Show people to think it was a glass boat. This is a conically developed hull, suggesting that flared hulls aren't the only ones that are graceful. Production cost is considered very reasonable.*

Garcia, president of Aluminum Cruisers. "This light weight gives her unequalled performance, with single engine speeds of 30 mph."

Garcia said that comparable craft built of conventional materials generally require twin engines to match this speed. A boat of the Marinette's size in steel or fiberglass would weigh about 10,000 pounds, he explained.

The Marinette's hull is made of ⅛-inch aluminum plate. Stringers and bulkheads are welded to the hull, thus eliminating external hull rivets. Styrofoam is added for buoyancy and soundproofing.

The interior of the aluminum cruiser is compactly designed, yet affords sleeping accommodations for six, a modern galley, complete head, and screened-in windows and door. The cabin has a 6-foot, 3-inch headroom and adequate closet and storage space.

The Reynolds Metals Co. entry was an experimental 15-foot runabout with a stretch-formed, 2-piece all-welded aluminum hull which is a product of Reynolds' product development department. In speaking of this model, Garcia said he believes that the experimental craft is the forerunner of many stretch-formed aluminum boats which can be mass-produced in the years ahead.

The technique, he said, permits flexibility of design not possible with aluminum before, and provides stronger hulls while lowering production costs. Planked construction, traditionally seen in wood craft from row-boats to cabin cruisers, is now being used in large aluminum boats. Perhaps the only exponent of the true planked construction in aluminum is by the Richardson Boat Div'n of United Marine, Inc., North Tonawanda, N. Y. Richardson is applying the technique to large cabin cruisers.

According to Masters Marine, Inc., Chicago boat dealer who will handle the line, Richardson is building the cruiser in 36, 40 and 43-foot lengths. The claim is that this is the largest aluminum-hulled line in production for pleasure boating. The planks, or strakes, are ⅛-inch thick and about 3 inches wide.

Planked Hull That's Different

The first unit to come off the Richardson line was on display at the New York Boat Show. It is a 40-footer with a 12-foot, 10-inch beam and 6-foot, 2-inch head room throughout the cabin. has sleeping accommodations for eig in three separate areas.

The hull, made by Avro Aircraft Lt Toronto, Ont., for the new Richards line, also has formed aluminum shap and extrusions for frames, stringers a floor timbers; aluminum bulkhea plate aluminum keel and garboa planks; castings for stem and stem kn Shaft logs and struts are cast aluminu with rubber bearings. Rudders are c aluminum.

To head off galvanic corrosion, t stainless steel self-tapping screws us for attaching the aluminum plankin are of the 300 series and thus passi to aluminum. The screws are dipp in an insulating rubber compound b fore insertion and the countersu heads are sealed with synthetic rubb

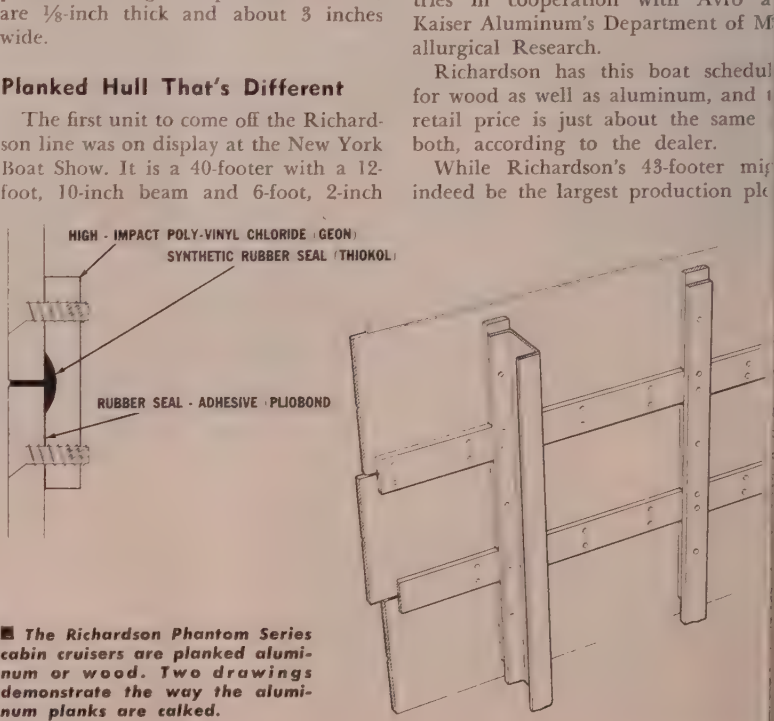
Calking's Different, Too

A polyvinyl chloride compou named Geon by B. F. Goodrich C Akron, Ohio, is used for the packi between ribs of the hull and the plan ing. Geon is chemically inert, has goo ageing characteristics and high strengt In the hulls of some of the Richards Phantom series, extruded Geon is us as a batten strip backing up the pla joints (see drawing). Thiokol and Pl bond are also used for calking.

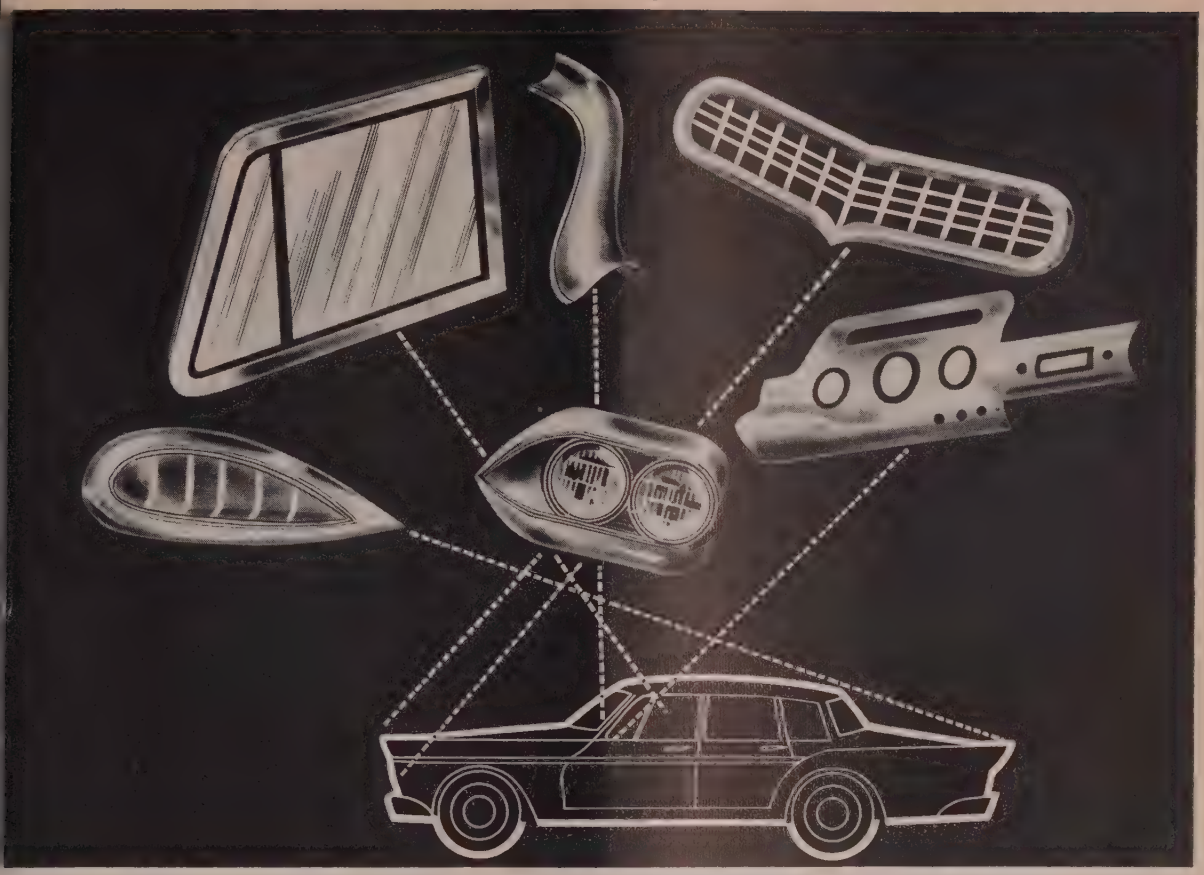
Four factors had to be considered establishing the exterior hull finish. T paint system used had to be protecti attractive, durable and yet capable being renewed by the average bo painter. The vinyl system curren used was devised by Pittsburgh Ind tries in cooperation with Avro a Kaiser Aluminum's Department of M allurgical Research.

Richardson has this boat schedul for wood as well as aluminum, and t retail price is just about the same both, according to the dealer.

While Richardson's 43-footer mi indeed be the largest production pl



■ *The Richardson Phantom Series cabin cruisers are planked aluminum or wood. Two drawings demonstrate the way the aluminum planks are calked.*



Aluminum adds the bright touch

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"Bright dipping" is a chemical polishing process that dissolves the microscopic high points of a metal's surface faster than its low points. Thus, a few minutes' dip in the solution smoothes and thereby polishes aluminum parts to a high lustre. Then they are anodized for protection against wear and corrosion. This unique polishing process—also used with copper, brass and stainless steel—is becoming part of the manufacture of a long list of products extending from automobiles to zippers.

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Cl	0.0001%	0.0001%	0.0001%
Fe	0.0002%	0.0002%	0.0002%
Pb	0%	0%	0%
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ure cruiser made of aluminum. custom built cruisers have been known to ru to greater lengths. Burger Boat Co. Burger 63A is one example. The Man towoc, Wis., yard built it to demonstrat aluminum's advantages and used 28,00 pounds of the light metal in its co struction.

Burger's newest luxury cruiser is 6 feet long and has a beam of 16 fee The all-welded hull was designed b Sparkman & Stevens, New York, a lead ing firm of naval architects. The alum num, plus technical assistance, was sup plied by Reynolds Metals Co.

Starcraft Boat Co., Goshen, Ind., re ports that its 1961 aluminum boat have been so popular that productio is scheduled for the rest of the yea The company makes a simulated lap strake aluminum hull in sections whic are riveted so that these fasteners can not be seen from outside the boa Seams are mastic calked. Boats, made i all standard lengths from 12 to 18 fee are guaranteed for 15 years.

Starcraft is reported to have an 1 foot inboard-outboard runabout sche uled for introduction next month.

The Picture's Fuzzy

Despite outward signs of fiberglas momentary advantage in boat sales, th opposite situation is reported by th Committee of Aluminum Producers, co-operative effort among Alcoa, Kais and Reynolds to improve the meta standing in the boat business.

"We know that fiberglass boats a losing ground in the outboard field said Kaiser's Carl Leveau. "They a still ahead in the cruiser field, but n for long! In sailboats fiberglass is de nitely ahead."

Leveau, up to press time the on member of the Committee of Aluminu Producers to respond to a Mode Metals query about aluminum in boa indicated that fiberglass's position sailboats in the family class would challenged as soon as the light met gains in the other classes were conse dated. He promised more immedi action in the cabin cruiser field.

"We aren't at liberty to tell you events soon to take place, but there w be numerous builders announcing p duction of aluminum cruisers later t year," was Leveau's cryptic promise.

The Committee's chart for past a projected sales of wood, glass and a minum outboard boats (including board-outboard) shows a glass boat s increase in '60 over '59 of 16% (100, over 84,000), while aluminum's gain the same period is negligible (125, sold in 1960); if the graph lines w extended, they would show fiberg catching up with aluminum in 19 The chart indicates a steady downw trend in sales of wood boats since 19

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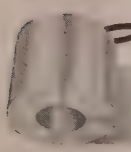

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Free-spinning, prevailing-torque, spring-action locknuts — locking washers — sealing washers — self-tapping studs — self-locking studs weld studs — tapping and locking inserts—sandwich panel inserts — grooved, slotted and spiral self-locking pins — retaining rings.

(Reprints of this 5-part series (44 pages) are now available. Use order form on page 81.)

LOCKING features are often more easily built into nuts than into bolts or screws. Thus, appreciable savings may be realized by using standard bolts plus locknuts—especially if large quantities of fasteners are needed.

If joint design prevents use of a locknut, yet requires a locked-in fastener, it may be necessary to use one of the self-locking screws or bolts described in the previous section (MM, April '61, p. 80). The alternative may be a standard screw or bolt plus a lockwasher.

However, self-locking nuts are among the most popular special fasteners. This accounts, in part, for the wide variety of proprietary makes. Aside from standard jam nuts, slotted nuts and castellated nuts (which will not be discussed here), most locknuts are of three general types — free spinning, prevailing-torque, and spring-action. (see Fig. 1).

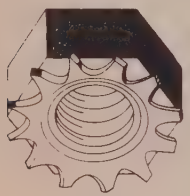
Each type has its own favored area of application. In general, however, locknuts are used when the joint is subjected to severe vibration or alternating tension loads which could loosen the fasteners; or when resilient or fragile joint members make it impossible to fully preload the bolt; or when the nut must lock in an intermediate position.

To Avoid Galvanic Action . . .

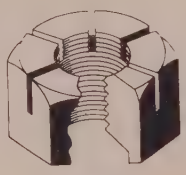
If the locknut comes in contact with an aluminum bolt or joint member, the nut itself should be made of aluminum to avoid galvanic corrosion. Fortunately, many free-spinning and prevailing-torque locknuts are available in aluminum, as well as other materials. Spring-action locknuts are usually made of spring steel, but most of them are available with corrosion resistant plated finishes.

Fig. 1: Three Types of Locknuts

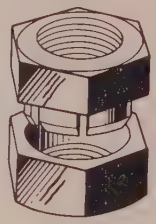
FREE-SPINNING



KEPS

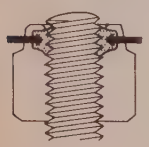


MARSDEN

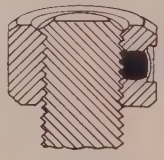


DRAKE

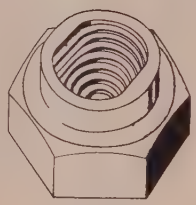
PREVAILING-TORQUE



ESNA



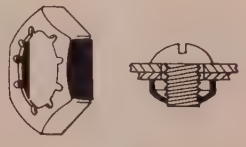
NYLOK



LAMSON

SPRING-ACTION

SPEEDNUT



PALNUT

Free-Spinning: As its name impli this type of locknut turns freely on t bolt until clamping force in the jo becomes great enough to bring the lo ing action into play.

Free-spinning locknuts are often spe fied when long travel of nut on bolt unavoidable. Since most of them depe upon clamping force for their locki action, they are not usually recc mended for joints that might "rela through plastic deformation, or for f ening materials that may crack or cru ble when subjected to preload.

One of the most familiar free-spinn locknuts is the Keps nut, developed Shakeproof Division of Illinois T Works, Elgin, Ill., and licensed to s eral other fastener manufacturers. T preassembled 2-piece fastener usu consists of a standard or finished nut, plus one of the many Shakepr lockwashers (detailed later). The was is free-spinning, so that it may seat it properly, yet cannot drop off. It slightly countersunk on the under to facilitate starting of threading act

Standard material is unplated st but other materials and finishes available. Standard sizes range from 5-40 through 1/4-28 in standard mach screw nut series. The Keps is also m with mastic-filled dished washer.

A washer also provides the loc action in the Jacobson Combina Nut-Washer (Jacobson Nut Mfg. Kenilworth, N. J.). This one emplo dished spring washer that spins fr on the hex nut. It is produced in minum, steel, brass and stainless.

Still another free-spinning nut- washer combination is the Fastite Reliance Division of Eaton Mfg. Massillon, Ohio. This one has a he spring washer permanently attached finished hex nut. Washer is free to during tightening; nut is available standard coarse or fine threads, 1/4 to 3/8-inch. A variation is Reli Division's Tenz-Nut, with cup-sh spring washer which is adaptabl self-sealing designs.

A ratchet locking principle is ployed in the Tensilock nut prod

Russell, Burdsall & Ward Bolt and Co., Port Chester, N. Y. The teeth the underside of this washer-faced are angled on the advancing side to litate tightening, but cut vertically the reverse side so that they dig) the joint member.

esulting lock action is enhanced by ight flexing of the washer face, pro- ing constant spring tension. Result: ease torque is 40% higher than atening torque; nut won't work loose ler severe vibration.

he Whiz-Lock nut (MacLean-Fogg k Nut Co., Chicago 40) is somewhat ilar in operation. In this case the lerside of the nut has ratchet-like ations that do not obstruct tighten- , but do increase the amount of que needed to loosen the nut once y have embedded into the joint mber.

flection Locking

everal proprietary locknuts employ deflection locking principle, usually ieved by machining slots or grooves the top portion and providing a essed or concave seating face. The t turns freely on the bolt until it seats ainst the joint member. Further tight- ng causes upward deflection until threads in the upper slotted portion forced tightly against the bolt eads.

This locking approach is well exem- fied by the Marsden Locknut which licensed to several fastener manufac- ers (see Fig. 1). Usually produced in x style, the Marsden is slotted in its per portion to form six threaded seg- nts. The seating face is undercut so t only a rim of metal bears against joint member.

When the nut is wrenched down ht, a beam action forces the upper gments radially inward, producing a ht friction fit against the bolt threads. hread engagement is said to be greater an with standard nuts. The Marsden t is produced in aluminum, as well carbon steel, stainless, brass and onze. Several sizes are made with both arse and fine threads.

Some free-spinning locknuts are 2- ece devices, in which a wedging action esses the locking element against the lt threads. An example is the Drake knut made by The National Screw Mfg. Co., Cleveland 4, Ohio. The wer part looks like a standard hex t, except for its tapered, concave core. he top portion has a slotted conical own that fits into this core.

First the bottom nut is wrenched wn tight. When the top nut is tight- ed against it, the slotted crown seg- ents are cammed inward against the lt threads. The result is a positive cking action that resists severe vibra- on, yet is easily released with a half turn of a wrench. By using two wrench- es, the Drake can be locked in place at any position on the bolt.

The Columbia locknut (Columbia Nut & Bolt Co., Inc., Bridgeport, Conn.) employs a similar locking principle, but its upper portion is slotted lengthwise. It, too, can be used as a stopnut.

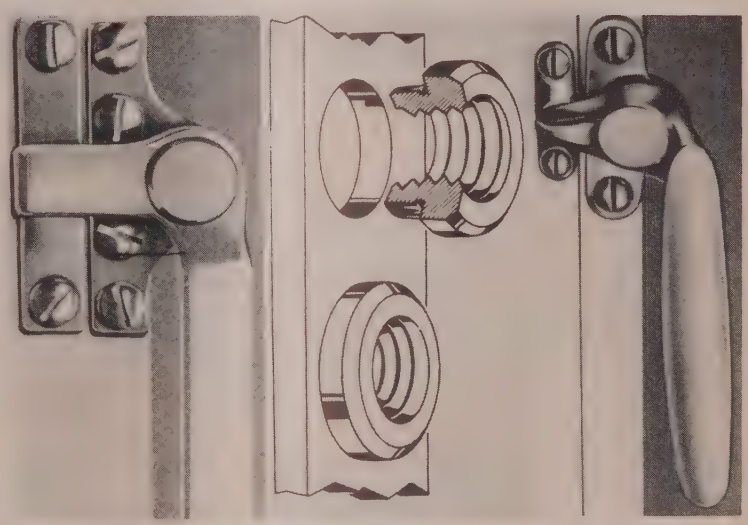
There are several other free-spinning locknuts, including: The Klincher, by Klincher Locknut Corp., Indianapolis 18, Ind.; the An-Cor-Lox, by Schnitzer Alloy Products Co., Elizabeth 1, N. J.; the Hi-Load, by Morse Products Development Co., Los Angeles 36; the Dura-Loc, by Delron Co., Inc., South Gate, Calif.; and the Anco-Nut, by Automatic Nut Co., Inc., Lebanon, Pa.

Prevailing-Torque: This type of locknut differs from most of its free-spinning cousins not only because of the different locking device employed, but also in the fact that its locking action does not depend upon preloading of the bolt or stud. In most cases, the built-in locking device becomes operative as soon as it engages the threads of the mating part.

For this reason, prevailing torque locknuts are not recommended for applications involving long travel of nut on bolt. Such prolonged travel under load could damage the locking element. Also, it's best to avoid blunt-end bolts, lest the starting thread damage the nut's locking element.

Perhaps the most familiar of all prevailing-torque locknuts is the ESNA, produced by Elastic Stop Nut Corp. of America, Union, N. J. The non-metallic locking collar in this fastener has an inside diameter that is smaller than the major diameter of the bolt or stud so that mating threads are formed in the collar when it engages the bolt threads.

The resulting compression of the red nylon collar creates a tight friction grip —not only in the collar but also in the metal threads of the nut. This assures uniform distribution of stresses over the



CASE HISTORY: Window Handle Screw Costs Reduced by Using Plug Nuts

The number of screws needed to hold locking handles in place on the aluminum curtain wall windows of the No. 2 Broadway Building, New York, was cut from four to two by using plug nuts made by Lamson & Sessions Co., Cleveland. The Lupton windows, made by Michael Flynn Mfg. Co., Philadelphia, are used for ventilation.

In previous installations the locking handles were held in place by four screws—driven in threaded holes in the aluminum window frame (at left). But by using Lamson Plug Nuts (center), made of aluminum, the handle was redesigned and held in place with only two screws (at right).

The Lamson Plug Nut is a threaded insert with a tapered knurled projection. The large end of the nut is larger in diameter than the hole into which it is pressed. When the nut is inserted in a tapped hole, material from the wall of the hole flows into the knurls and the groove between the projection and the head to securely lock it in place. The firm says its plug nut provides a threaded section in sheet metal or light gauge plate that is stronger than the mating screw.

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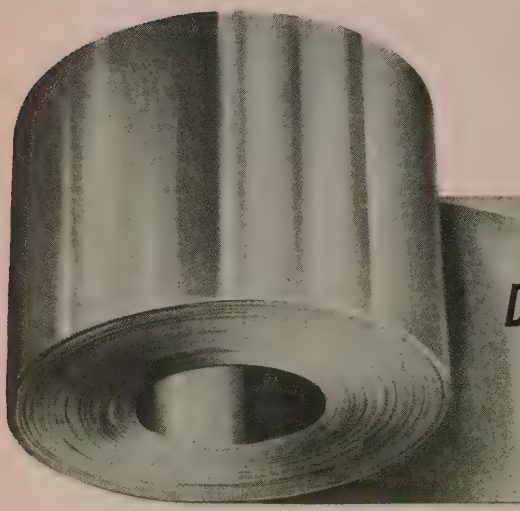

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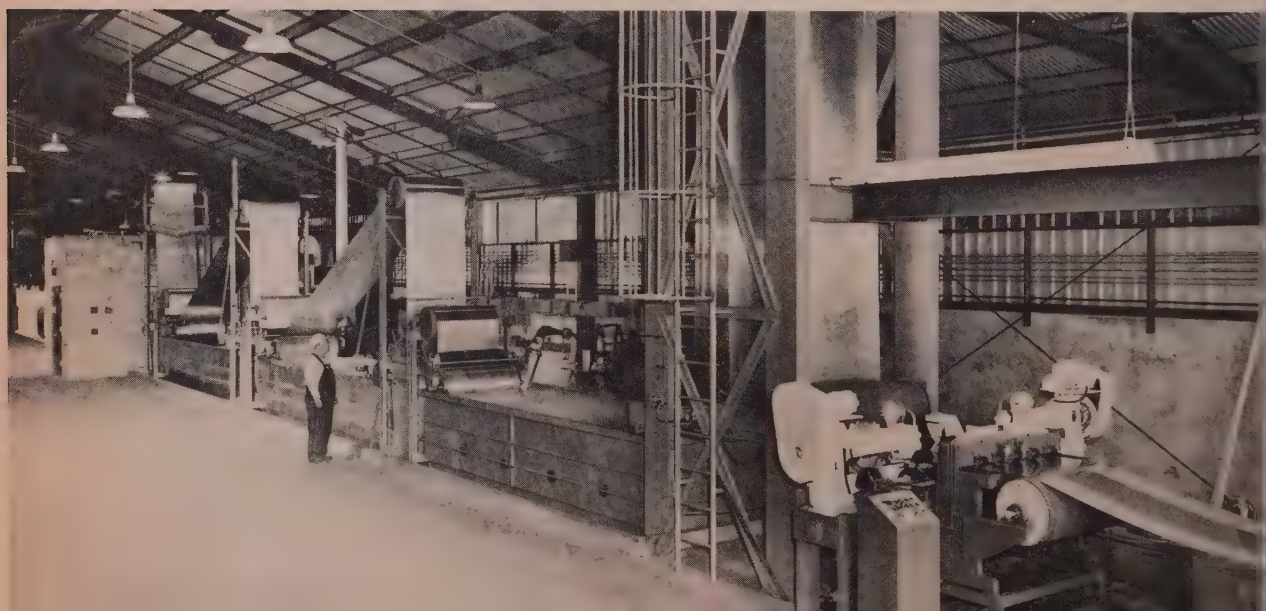

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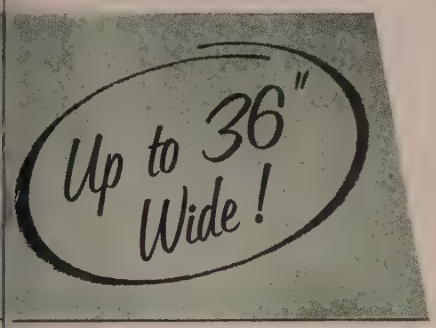

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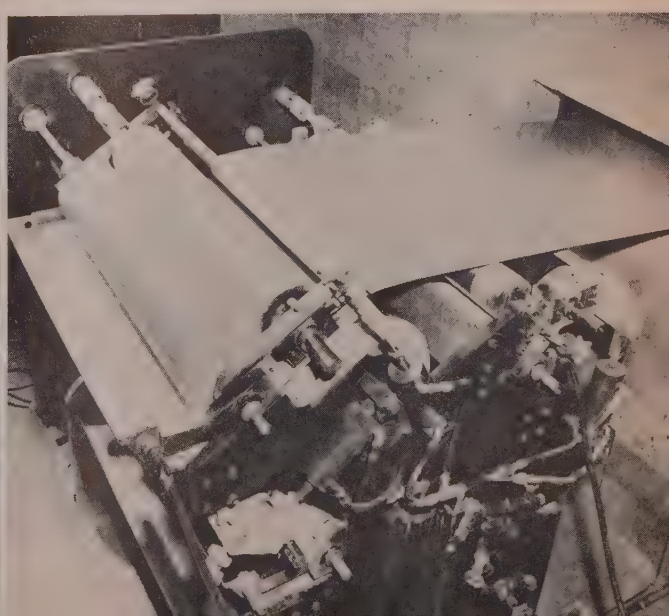


full length of thread engagement. The nylon collar also seals the joint against leakage, and its innate resilience permits repeated reuse of the nut.

The ESNA can be either wrenched up tight if preloading of the bolted joint is called for, or locked into position at any intermediate position if design requires relative movement of joint members. (In either case, of course, the nylon collar must engage the bolt threads.) The standard nylon collar is recommended for service temperature up to 250°F, but a special 350°F nylon element is also available.

The ESNA is produced in a full range of sizes (No. 0 through 2-inch) with both NC and NF threads; and is available in aluminum, steel, stainless steel, and brass. Body styles include not only the standard stop nut shown in Fig. 1, but such specials as anchor, clinch, spline, gang channel, metal cap, nylon cap, self-wrenching, and others.

A similar line of fasteners is produced by Greer Stop Nut Co., Chicago. The standard Greer stopnut is a hexagonal nut body with a green nylon or fiber locking collar enclosed in its compression head. The locking principle is the same as that of the ESNA. Body material is aluminum, steel, stainless or brass; sizes range from No. 0 through 1¼-inch; threads are NC and NF, class 2B and 3B fit.

Other Non-Metallics

Other prevailing-torque locknuts with non-metallic locking elements include the Nylok, by Nylok Corp., Elmira, N.Y.; and two by Jacobson Nut Mfg. Corp., Kenilworth, N.J. Except for the Jacobson Stop Nut, these differ from the ESNA primarily in the shape and position of the locking element.

The Nylok is a standard hex nut with a radial nylon plug inserted in one side. Threading of nut onto bolt compresses plug, creating friction grip between mating threads. Insert also helps seal against leakage. Double-chamfered nut can be started from either side; is readily adaptable to application by automatic machines. Nylok is produced in aluminum, steel, stainless and brass; is available in sizes No. 4 through ¾-inch with both NC and NF threads, Class 2B and 3B fit. Other body styles include clinch and cap nuts.

Jacobson's J-Lok is a standard hex nut with Delrin ring inserted midway in threaded portion. Ring is compressed when nut is installed, producing tight friction fit. Made of aluminum, steel, stainless and brass, the J-Lok can be started from either side; is reusable.

Another oft-used prevailing torque locking principle is exemplified by the Kaylock lightweight locknut (The Kaynar Co., Los Angeles 54), the upper portion of which is slightly elliptical in shape. The nut is free-spinning u bolt threads encounter this off-r portion. From that point the nu wrenched down. Friction locks it t

In the Huglock (National Mac Products Co., Utica, Mich.), the ta and slotted upper crown has six thi ed segments that are keyed in slig to grip the bolt when it engages segments. Downward pressure exert this action insures uniform distribu of load across all mating threads. lock is produced in aluminum other metals; is available in sizes 10 through 1½-inches.

A similar locking action is empl in the Flexloc, by Standard Pr Steel Co., Jenkintown, Pa.; and in ESNA Beam-Type Locknut, by El Stop Nut Corp. of America, Un N.J. The Flexloc is produced in al num, as well as other metals.

Some prevailing-torque locknuts rive their locking power from sligh tortion of threads, achieved by pressing or staking the nuts on or more sides. Example: The M-F 2 Locknut, by MacLean-Fogg Lock Co., Chicago 40. Slight distortio center threads of this nut produc vibration resistant friction fit. Nut be started from either side; is prod in aluminum, steel, brass and stai

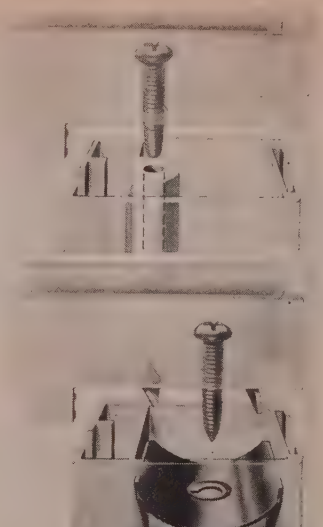
The open-end acorn locknut by sell, Burdsall & Ward Bolt and Co., Port Chester, N.Y., is stake two sides to distort center threads s ly, producing a friction fit. Mad aluminum and steel, it is availab sizes No. 10, ¼-inch and 5/16-inc

Colored Plastic Nuts

The same company also pro open-end locknuts in Delrin, DuP new high-performance plastic. Th are formed when the nut is inst Available colors include aluminum tallic gold and off-white. Strip torque is over 20 inch-pounds for 10 size; 25-30 inch-pounds for ¼ size.

An unusual prevailing-torque nut is the Tru-Lok, by Waltham cision Instrument Co., Waltham, This aluminum hex nut has a sta steel thread insert with standar degree threads. The center loop o insert is polygon shaped; produc positive spring locking action wh engages bolt threads. Insert also vents galling of mating threads; is ly resistant to corrosion; permits e sive reuse of the nut. Sizes: No. 7/16-inch; NC and NF threads; 3

Spring-Action: Enormous quan of these lightweight, low-cost, tim ing fasteners are used in most production industries. Generally are stamped or otherwise formed heat treated spring steel. Some are



CASE HISTORY: Spring Fasteners Trim Costs of Extruding Window Frames

Aluminum window designs sometimes call for an integral half-round strip to be extruded in side and end frames, running their full length. This hollow strip provides a fastening base for self-threading screws (top) used to hold the frames together. But this design is costly because only ¾-inch of the half-round is needed for this purpose.

An aluminum spring fastener called Channeloc completely eliminates the need for the half-round strip. Made by George K. Garrett Co., Philadelphia, the fastener consists of a rectangular, dish-shaped plate with two square edges and a screw hole formed with a cone impression. To install, the dish is fitted inside the rectangular channel of one frame (bottom), and another frame is fitted at a right angle to the first. A sheet metal screw is then tightened into the spring fastener, flattening it and causing the square ends to bite into the aluminum channel sides so the frames are held together securely. Since the fastener is made of aluminum there are no galvanic corrosion problems.

Use of the fastener simplifies the extrusion die, saves metal by eliminating the half-round strip, and requires only the use of sheet metal screws rather than self-threading screws.

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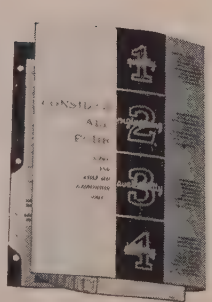

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made of stainless steel, phosphor bronze, beryllium copper, and aluminum. Some spring action nuts can accommodate normal threaded fasteners; others cut their own threads as they are installed; and still others are simply pushed onto unthreaded studs, rivets, rods, etc.

The most familiar spring-action nuts are the Speed Nut, by Tinnerman Products, Inc., Cleveland 1, Ohio; the Palnut, by The Palnut Co., Mountainside, N.J.; and the Prestole, by Prestole Corp., Toledo 5, Ohio. Each company makes several types, many of which bear little if any resemblance to conventional nuts.

Speednut; Palnut; Prestole

The Tinnerman Speed Nut develops a dual locking action when applied. Its two free-acting prongs engage the screw thread and press inward on it as the screw is driven. At the same time the arched base of the device is flattened, thus exerting an upward thrust t makes the prong grip even tighter. sult: A locking force that stoutly resi extreme vibration.

Standard sizes range from No. through 3/8-inch. Several corrosion sistant finishes can be had. Variatic of the Speed Nut include edge cli push-on nuts, angle brackets, nut tainers, etc.—each designed to simpl a specific type of fastening operati When used with screws or bolts, Speed Nut remains stationary; it is n essary to tighten the threaded fasten

The Palnut, on the other hand, c be snugged down by hand, then with an additional half-turn of a wren Stamped from spring steel, and giv any of several protective coatings, Palnut is available in several style regular or inverted hex, acorn, wi type, washer type, etc. The Palnut a develops a dual locking action, and reusable if not over-torqued. Sizes ra from No. 3 to 2½-inch.

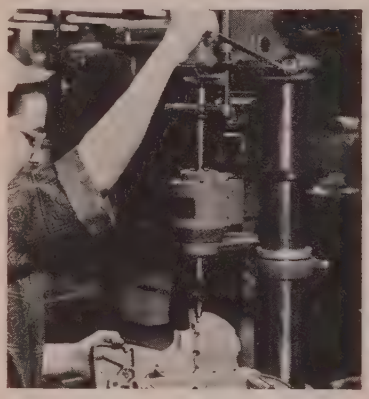
Palnut Co. also makes a Pushr that features a 9-point grip on threaded studs, rods, and the like; a a self-threading nut that cuts its mati threads then locks itself in place spring action.

The Prestole Sheet Metal Clip fers from Palnut and the Speed Nut that it takes a full 360 degree g on the thread root of the mating scr or bolt. Designed for edge fasteni of sheet metal assemblies, it is read installed when only one side of work is accessible. Prestole Corp. a has a push-on fastener and a self-thre ing locknut.

Other spring-action locknuts inclu Crest Nut, by Crest Products, I Union, N.J.; Triangular Nut, by Wal Kohinoor, Inc., Long Island City, N the Fishtail, by United-Carr Faste Corp., Cambridge 12, Mass.; the Clin It, by Robin Products Co., Warr Mich.; and the Dot thread cutting ta up fastener, by Carr Fastener Co., Ca bridge 42, Mass.

Spring-action nuts are rarely rec mended for joints that must withsta high stress in tension. Before spec ing them in such applications it's b to consult the manufacturer regardi permissible load on the fastener question.

Non-locking nuts that merit con eration for special applications inclu press-in nuts such as the Plug N shown in the case history on page Other nuts that are mechanically lock into the workpiece include the Clin Nut, by Grip Nut Co., South Whitl Ind.; the Captive Nut, by National C Inc., Malden, Mass.; the Pem S Clinching Nut, by Penn Engineeri & Manufacturing Corp., Doylesto Pa.; the Perma-Nut by Tubular Ri



CASE HISTORY: Self-Tapping Inserts and Studs Simplify Manufacture, Maintenance of Chain Saws

Self-tapping inserts by Groov-Pin Corp. (Ridgefield, N.J.), and Schweppe self-tapping and self-locking studs by Pheoll Mfg. Co. (Chicago 50), are used in chain saws manufactured by Homelite Division, Gastonia, N.C.

Three Tap-Lok inserts are used in the magnesium saw housing: Two to hold the bumper plate to the housing; one to secure the fuel tank. Homelite also uses two more inserts to fasten cylinder shields.

Chain saws find their widest and most gruelling application in the lumber industry where they must operate at top speed for eight hours a day. This necessitates frequent removal and replacement of the spiked bumper plate for maintenance purposes. This could damage threads made in the relatively soft castings, so Tap-Lok inserts are used to provide wear-resistant threads.

Tom Pelagalli, Homelite engineer, estimates that the total cost of installing a Tap-Lok is only one-third that of other types of inserts. The inserts also reinforce the bumper plate which must absorb severe shock; and can be run into a shallower hole since there is no chip clearance problem.

No special application tools are needed. Example: To fasten the fuel tank the insert is driven into a mounting tab using a standard 17-inch drill press (left photo) equipped with a standard tapping head.

The one-piece Schweppe stud is self-tapping and self-locking. One end is a standard nut end; the other is double-slotted for cutting. The slot makes it adaptable to automatic feeding and driving. Stud threads perform three jobs: The first three threads, along the slots, do the cutting; the next three are forming threads and have the same pitch as cutting threads; and the top three threads have a larger pitch which imparts frictional interference thus locking the stud in place by squeezing against the mating threads.

Four studs are used to fasten the saw cylinder head to the crankcase. Schweppe studs withstand constant saw vibration because they penetrate deeper than other studs, offering extra thread engagement. Also, the nut can be removed and the cylinder taken off without the stud backing out. This is necessary for disassembly and maintenance.

To apply the studs, a steel jig is clamped over the crankcase (right photo) to insure straight stud tapping and driving. The plate also keeps studs from being driven beyond proper depth and torque. Air powered guns and specially designed stud drivers made by Titan Tool Co., Fairview, Pa., are used to drive studs. (Inset shows driven studs.)

Homelite says the studs cut direct labor costs 32% by completely eliminating the tapping operation. An additional 15% saving in materials resulted. There were indirect savings, too. Casting handling was lessened; the drill spindle was freed for other work; tap wear was reduced; and chip removal from threads and thread inspection were eliminated.

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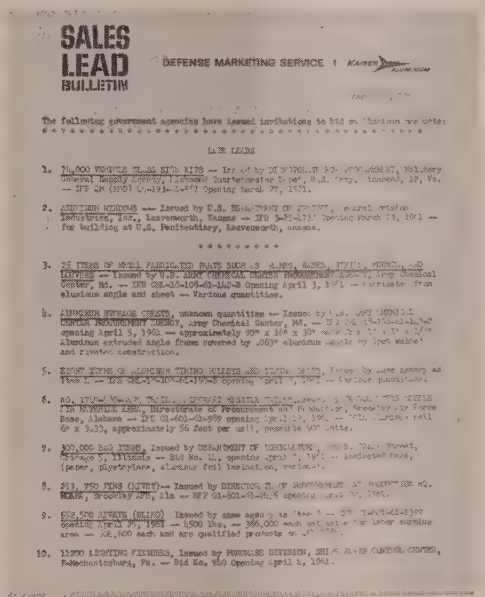
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2. ANCHORING MOLDINGS — Issued by U.S. DISCIPLINARY BARRACKS, General Prison Industries, USDB, Leavenworth, Kansas — IFB 3-PI-471 Opening March 23, 1961 — For building at U.S. Penitentiary, Leavenworth, Kansas.

* * * * * * * * * *

3. 26 ITEMS OF METAL FABRICATED PARTS SUCH AS ANGLES, PLATES, CHANNELS, AND BRACKETS — Issued by U.S. ARMY CHEMICAL RESEARCH DEVELOPMENT LABORATORIES, Army Chemical Center, Md. — IFB CML-18-105-61-1A2-B Opening April 3, 1961 — Fabricate from aluminum angle and sheet — Various quantities.

4. ALUMINUM STORAGE CHESTS, unknown quantities — Issued by U.S. ARMY CHEMICAL CENTER PROCUREMENT AGENCY, Army Chemical Center, Md. — IFB CML-61-53-61-1A-C Opening April 5, 1961 — Approximately 40" x 16" x 10" [illegible] Aluminum extruded angle frame covered by .063" aluminum sheet by spot weld and riveted construction.

5. EIGHT TYPES OF ALUMINUM TIMING PULLEYS AND HUBS, Issued by same agency as Item 3 — IFB CML-61-105-61-197-B Opening April 5, 1961 — Various quantities.

6. NO. 17[illegible] [illegible] — Issued by [illegible] for MUNITIONS BOARD, Directorate of Procurement and Production, Brooks Air Force Base, Alabama — IFB 61-601-61-909 opening April 5, 1961 — [illegible] coil 6" x 3.35, approximately 56 feet per coil, pounds per coil.

7. 450,000 BAG TIES, issued by DEPARTMENT OF AGRICULTURE, [illegible] Service V, Illinois — Bid No. 11, opening April [illegible], 1961 — Lockpost cord, (paper, plastylene, aluminum foil laminated, various).

8. 213,750 PINS (ALTIT)— Issued by DIRECTOR OF PROCUREMENT AT NAVY YARD NO. MAIN, Brooklyn 201, NY — RFP 61-SOL-61-2[illegible] opening [illegible], 1961.

9. 652,500 STRIPS (RELIC) Issued by same agency as Item 8 — IFP 61-SOL-61-2389 Opening [illegible] 29, 1961 — 1,500 lbs. — 366,000 each not [illegible] labor surplus area — 286,600 each and are qualified products of [illegible].

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& Stud Co., Wollaston, Mass.; and the Teenut, by Carr Fastener Co., Cambridge 42, Mass.

Washers: Locking; Sealing

Plain flat washers are used under screws, bolts or nuts in order to: 1. Distribute clamping load over a wider area; or 2. provide a bearing face for rotating nuts or bolts; or 3. span oversized clearance holes. Standard aluminum washers are available in a full range of sizes for virtually any application (see MM, March '61, p. 66).

Many special washers perform functions such as locking, sealing and insulating. Some of these, such as helical spring washers and tooth lockwashers, are covered by American Standards. Both types are available in aluminum, spring steel, stainless, bronze, etc.

Countersunk finishing washers are also produced in aluminum, and are generally used for decorative purposes or for fastening soft materials (cloth, leather, plastic, etc) to metal. They are often used in combination with oval countersunk sheet metal screws.

Helical: This is essentially a spring take-up device, designed to compensate for looseness that may develop in a joint during service. The helical spring washer may also facilitate disassembly by reducing friction between a bolt (or screw) and the joint member it bears against. Some helical spring washers have turned-up or barbed ends that bite into the joint member and fastener head when the bolt or screw is tightened. This combines a locking action with the usual spring action.

Tooth Lockwashers: The most familiar example of this type is the Shakeproof Lockwasher, by Shakeproof Division of Illinois Tool Works, Elgin, Ill. Often used on Sems screws and Keps nuts, this auxiliary fastener derives its locking action from its multiplicity of tapered and bent teeth that bite into the fastener and workpiece when the joint is tightened.

When this washer is flattened between a bolt head and workpiece, each tooth strives to return to its original twisted shape. Thus, the teeth tend dig in even deeper when the joint subjected to vibratory stresses.

The teeth of the Shakeproof wash may be external, internal or both, a twisted to lock either right hand left hand threads. The external ty provides the strongest locking actio the internal type is used when tee should be hidden from view; the int nal-external washer is good for lockin adjustable parts in position or whe a large bearing area is wanted.

The washer itself may be flat countersunk for most uses; domed dished for wide distribution of clam ing force; or formed to other shap for specialized applications. Mastic co pound may be included to preve leakage of the joint. Spring steel the standard material, but the wash is also available in aluminum, stainle bronze and other materials.

Another washer of this general ty is the Everlock, by Thompson-Brem & Co., Chicago 10. The teeth (extern internal or both) of this washer pr vide two alternating chisel edges whi dig into the fastener and workpie when the joint is tightened. Temper carbon steel is the standard materi but the Everlock is also available stainless steel.

Sealing Washers: In aluminu products, the most common seali washer is the Weath-R-Seal, by Fab cated Products Co., West Newton, M Widely used in building applicatio it consists of a neoprene sealant perm nently bonded to a washer made aluminum, steel, stainless, or vulcaniz fibre. When compressed during asse bly the neoprene forms a tight se around the periphery of the washer a around the shank of the fastener.

Standard diameters range from 5 inch to 3-inches; neoprene thickness from 1/16 to 3/32-inch, though spec thicknesses of 7/64 to 9/64-inch can had. Black neoprene is standard, b other colors are available.

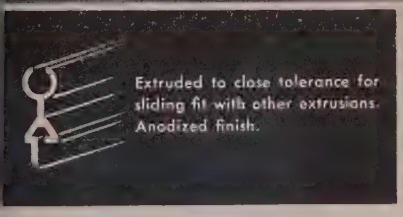
More elaborate sealing washers a the Stat-O-Seal and the Gask-O-Se both by Parker Seal Co., Culver Ci Calif. The latter is most often us with high performance rivets such the Hi-Shear (see MM, April '61, 78). It consists of a rugged metal ri which is undercut on its seating fa to accommodate a specially shaped ru ber sealer that is compressed to a r tangular cross section during instal tion. Full metal-to-metal contact fr rivet to washer to joint member assu maximum clamping force.

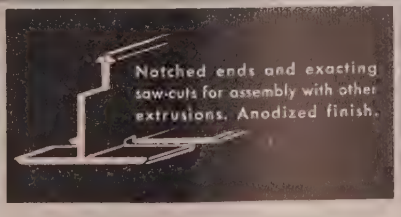
The Stat-O-Seal is a silicone or nitr rubber O-ring molded into the I.D. a flat washer made of cadmium plat steel or anodized 7075-T6 aluminu When installed it creates a pressure-tig

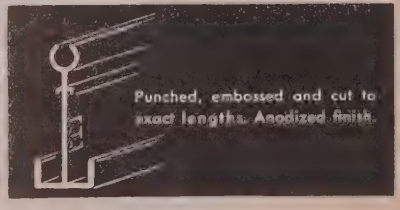
CASE HISTORY: Threaded Inserts Hold Window Hardware Fast

Banc-Lok tapped holes made by Boots Corp., Norwalk, Conn., are specified for attaching hardware to all of the aluminum windows made by S. H. Pomeroy Co. The tapped hole this firm uses is a diamond knurled insert actually designed to replace molded-in inserts and threads in both plastic and metal castings. But it offers advantages in use on aluminum extrusions, too. As shown above, no special tool is needed to apply the insert; it is merely pounded into a drilled or punched hole. As it enters the hole (left in inset), its slotted end is compressed so the resulting tension holds the insert securely in place (center) without it having to be bottomed in the hole. As the screw is driven into the insert, the slotted end expands (right). Boots says this provides a double locking action—the insert in the hole and the screw in the insert. Banc-Lok inserts come in aluminum, brass, steel and stainless. Inserts are available for screw sizes and threads from 2-56 to 3/8-16. Insert length varies with screw size; ranges from 5/32 to 5/8-inch.

when you design a new product, remember...







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seal without hindering metal-to-metal contact. The same company also makes Lock-O-Seal, a 2-piece device in which the synthetic rubber O-ring is completely entrapped by the metal washer, the fastener and the joint member.

A special nylon washer called Dubo is said to both seal and lock bolted assemblies. When a nut is tightened against the Dubo, the I.D. of the washer flows against the bolt threads, sealing them against leakage, while the periphery of the washer flows out and around the nut, thus preventing it from shaking loose. Manufacturer is Nylogrip Products, Watertown, Mass.

Other special washers include spring washers—available in seemingly limitless shapes and sizes from several manufacturers—and such items as the aluminum fairing washers, large quantities of which are used to minimize localized stress concentrations when countersunk screws are employed to assemble aircraft components.

Studs: Self-Tapping; Locking

Despite the development of improved bolts, nuts and inserts, many products are still more easily and economically assembled with studs. The use of studs and locknuts can cut costs in many applications because tolerances can be less stringent. In cast components, particularly, misalignment or off-squareness can cause trouble if bolts are used. If the bolt head doesn't seat squarely, one side of it sustains a disproportionate share of the load. On the other hand, a locknut usually has sufficient "play" to compensate for a slight off-square condition when tightened down on a stud.

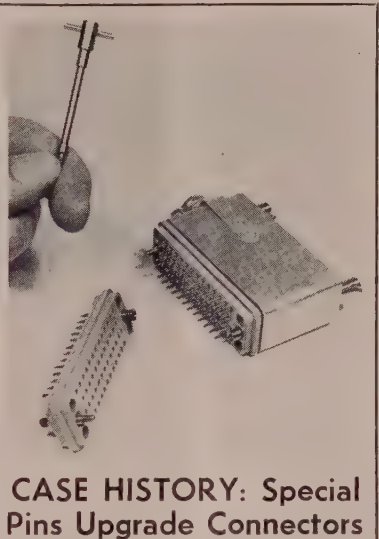
Studs may also speed assembly, especially if gaskets or other separate parts are placed between elements of a joint. Once the studs have been installed, such parts can often be stacked on them before final assembly. By the same token, studs may act as pilot pins.

Owing to its relative softness, aluminum is particularly amenable to the use of self-tapping studs such as the Schweppe described in the case history on page 76. This eliminates the cost of tapping holes. With die castings, in fact, it is often possible to core in the holes, thus avoiding the drilling operation, too.

The Schweppe is also a self-locking stud; its interference locking threads develop sufficient holding strength to resist the back-off torque of locknuts. Driving torque is comparatively low, and the stud is well suited to automatic driving operations (the slotted tapping end serves as a selective positioning feature in hopper-fed machines).

Made of case hardened steel, cadmium plated for corrosion resistance, the Schweppe stud is produced in sizes No. 6 through 1-inch diameter, and is available in virtually any length.

The Rosan self-tapping stud (Rosan, Inc., Newport Beach, Calif.) is similar to the Schweppe in function. It taps its mating threads as it is driven (by conventional power drivers), then locks itself in place with its interference-fit threads. It is produced in sizes No. 6 to ½-inch diameter; is available with NC or NF threads, class 3A.



CASE HISTORY: Special Pins Upgrade Connectors

Solid Groov-Pins (Groov-Pin Corp., Ridgefield, N. J.) have replaced hollow pins when fastening electronic connector screw-lock assemblies at Continental Connector Corp., Woodside, N. Y. This resulted in a tight-fitting, permanent assembly, made faster and cheaper than before. The pins also serve as hand grips for tightening or loosening the screw locks which hold the male and female connectors.

Hollow pins had required close tolerances on mating parts, tedious assembly, and their rough surface made them poor hand grips. Groov-Pins were selected because they give a tight fit without close mating part tolerance, are easy to insert, and have a smooth finish.

When the Groov-Pin is forced into a hole drilled to pin diameter, the constraining action of the hole wall compresses the pin material, thus producing a permanent locking fit. Also, by inserting the pin to the point where it holds fast and the grooves are no longer visible, the assembler is assured that the pin is centered. Hollow pins required many adjustments before seating correctly.

For some applications, Continental used a combination of hollow pins and set screws. Now, No. 5 Groov-Pins eliminate the set screws and the need for drilling holes for them.

Other self-locking studs include th Long-Lok, the Nylok, and the Lo Thread, all of which employ lockin principles identical to those of the machine screw counterparts describe earlier (see MM, April '61, p. 80). Th Keensert stud also uses the same loc ing principle as the Keensert insert d scribed earlier (MM, March '61, p. 76

The Kelox stud (Fasteners, Inc., Eas Boston, Mass.) is a 2-piece self-lockin device that derives its locking actio from a keyed ring that is depressed aft the stud has been positioned. The tw keys cut through the tapped thread thus locking the stud in place.

Another type is the insert stud, usua ly intended for use in thin sectio such as sheet and extrusions. An ex ample is the Pem Self-Clinching stu (Penn Engineering & Mfg. Corp., Doyl town, Pa.), a standard threaded stu with a specially shaped head. Whe driven into a prepared hole the proje tions in the head embed themselve into the parent material, and displace material flows around the back-tapere head to lock the stud in place.

The My-T-Grip stud (My-T-Gri Mfg. Co., New York 38) has a press-i head with recessed knurled grooves tha are encircled by displaced material whe the head is forced into a prepared hol It is suitable for use in sections as thi as .030-inch.

Weld Studs

Of the various weld studs, a typ that is commonly used on aluminu is that of Nelson Stud Welding Div Gregory Industries, Inc., Lorain, Ohi The Nelson stud, either threaded c plain, has a small amount of weldin flux bonded to the welding end.

A special modified electric arc proce welding gun holds the stud in positio over the work for a predetermined p riod during which a portion of the stu and the plate is melted, then plunge the stud into the pool of molten met to complete the weld.

Very little skill is needed to attac studs, and the welded joint is said t be stronger than the stud itself. Applic tion rates run as high as 6 or mo studs per minute. Standard stud size range from ⅛-inch (for insulation pin to 1-inch diameter.

The O-G stud welding system (Omark Graham Industries, Portland, Ore.) em ploys a stored energy process that pr duces welding heat so quickly that ther is virtually no marking of the workpiec even if the opposite side has bee enameled, plated or anodized. (For description, see MM, Nov. '60, p. 88

Somewhat similar is the CD weld stu of KSM Products, Inc., Moorestow N.J. In this case the stud has a broa weld base and is attached to the paren material by a capacitor-discharge pro

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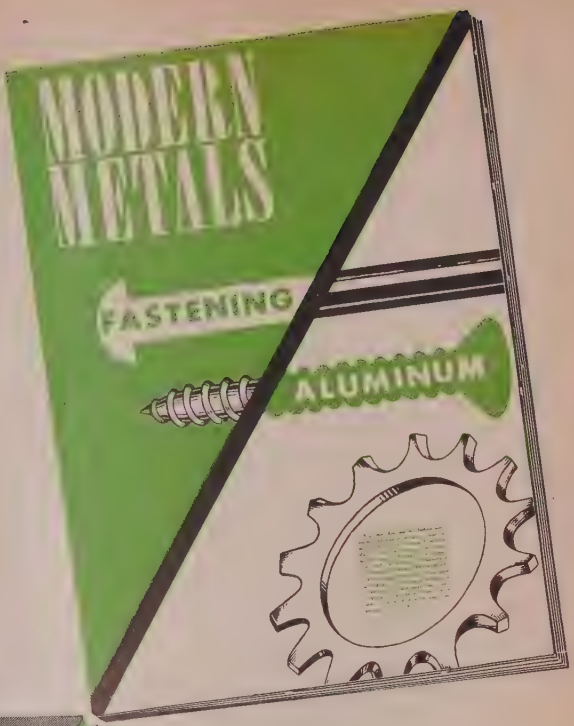

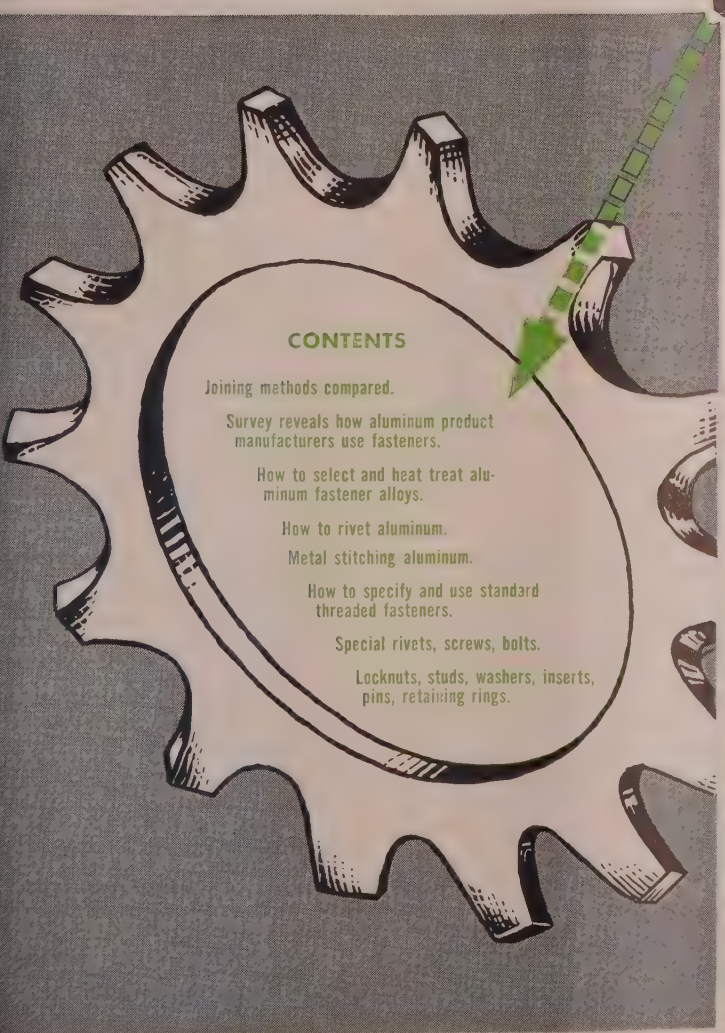
CONTENTS
Joining methods compared.
Survey reveals how aluminum product manufacturers use fasteners.
How to select and heat treat aluminum fastener alloys.
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ess that permits attachment to thin material without warping or discoloring thin or finished surfaces. Stud sizes range from No. 6 to ¼-inch; lengths from ¼-inch to 3 inches.

Inserts: Thin-Wall; Self-Tapping

Threaded inserts are often specified for aluminum products – particularly if fasteners are to be removed and replaced frequently. Such inserts provide stronger, more wear resistant threads, thus eliminating or minimizing the need for tapping of holes or repairs.

Three well-known inserts – the Heli-Coil, the Tap-Lok, and the Keensert – were described in an earlier part of this report (see MM, March '61, p. 76). A few other inserts that are particularly useful for aluminum products will be dealt with here.

A good example is the Slimsert, by Rosan, Inc., Newport Beach, Calif. This thin-walled, high-strength, internally and externally threaded device is especially useful in applications requiring stronger threads without appreciable increase in weight; or where edge distance or access are limited.

Special Rosan tools are used to install Slimsert into tapped and counterbored holes, and then lock it in place. External lock is achieved by swaging top collar so that external serrations are forced into surrounding parent material. One series of Slimserts also has an internal prevailing torque locking feature to lock mating screws or bolts in place.

Slimserts are made of both corrosion resistant steel and 2014-T6 aluminum in sizes to accommodate fastener sizes No. 10 through ½-inch.

Another thin-wall insert is the Kaylock (Kaynar Mfg. Co., Inc., Los Angeles 54). This one also has an externally serrated locking collar that is expanded into the parent material after the insert has been driven into a properly tapped and counterbored hole. In this case, however, a special combination tool both drives and swages the insert in uninterrupted sequence.

There are several other inserts that are mounted in tapped holes. One is the ESNA locking insert (Elastic Stop Nut Corp. of America, Union, N. J.). Its modified external thread creates a friction fit to lock it in the tapped hole. Internal locking is produced by either a nylon locking collar or a slightly off-round section that grips the bolt.

The Nylok insert (Nylok Corp., Elmira, N. Y.) has a radial nylon plug that produces a prevailing-torque locking action on both internal and external threads.

Some inserts derive their locking action from expansion that occurs when the mating fastener is installed. An example is the Banc-Lok, shown in the case history on page 78. Another is the Taper-Thread (Fastener Products, Inc., Wilton, Conn.), a slotted device with knurled bottom end that expands and locks into parent material when a screw is driven into it, plus a serrated top collar that prevents the insert from twisting in the hole.

Inserts for Panels

The fast-growing use of structural panels in the building industry and in aircraft construction has fostered a demand for special types of fastener inserts. One company that strives to satisfy this need is The Delron Co., Inc., South Gate, Calif.

Delron manufactures several types for use in sandwich panels. Its blind insert, for example, is an internally threaded sleeve and headed plug that is inserted in a drilled hole in the panel and clinched to the panel facing sheet by a special pull-up tool. The company also makes a floating nut model that compensates for misalignment of mating parts; a molded-in type that provides a flush blind fastening; and a high strength insert that not only provides a threaded hole but also strengthens the panel at attachment points.

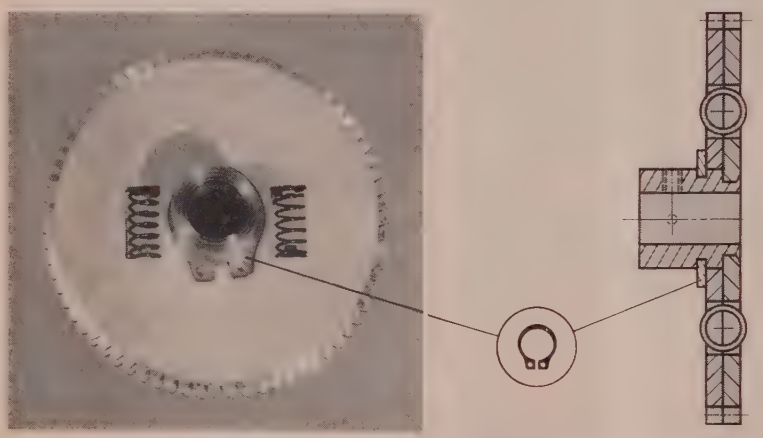
Another company that makes panel inserts is Shur-Lok Corp., Anaheim, Calif. The Shur-Loks include not only clinch-spacer types and a molded-in insert, but also a spacer-nut unit that is designed to transmit shear loads through the panel and into the supporting structure.

Groov-Pin; Rollpin; Spirol

Pins are simple fastening devices that can sometimes replace rivets, screws or bolts to improve the efficiency of a joint, enhance the appearance of a product, or reduce assembly costs. They are normally used when the stress is primarily in shear, but can often serve more than one purpose, as in the case history on page 80.

Standard pins come in several styles —straight, tapered, dowel and clevis— and most often perform such jobs as holding gears on shafts or serving as the joining element in hinges. Cotter pins, of course, are frequently used to lock slotted or castellated nuts to bolts.

Proprietary pins that lock themselves



CASE HISTORY: Retaining Rings Increase Accuracy of Aluminum Anti-Backlash Gears

Accuracy was increased and manufacturing costs reduced when external retaining rings were designed into these anti-backlash gears. Waldes Kohinoor Inc., Long Island City 1, N. Y., supplies the rings (Waldes Truarc Series 5100). The unit above consists of two spring-loaded aluminum gears mounted on a machined stainless steel hub. In the original design, a blank for the floating gear was slipped over the back of the hub and positioned next to a machined shoulder. A similar blank for the fixed gear was positioned against a second shoulder and staked to the back of the hub. Gear teeth were then cut in blanks and parts were deburred. Because the two gears could not be separated, deburring was slow and costly. Rejects averaged 10%.

With the Truarc ring, a smaller hub is used and one machined shoulder is eliminated. Assembly is made from both directions: The fixed gear blank is pressed onto the back of the hub and staked into position; the floating gear blank is slipped over the front of the hub and secured with the retaining ring. After gear teeth are cut, the unit is disassembled and gears are deburred separately. Parts are then re-assembled and once again secured with the external ring. The new assembly provides a freer gear roll and, because of improved deburring, greatly increases the unit's accuracy.

position are more often found in uminum products. The more familiar these are the Groov-Pin (Groov-Pin orp., Ridgefield, N.J.); the Rollpin Elastic Stop Nut Corp. of America, nion, N.J.); and the Spirol (C.E.M. o., Inc., Danielson, Conn.).

The Groov-Pin has three longitudinal rooves rolled or pressed into its surce in such a way that material is disaced. When the pin is driven into properly undersize hole the displaced aterial is forced back toward the roove, creating a potent radial force at locks the pin firmly in place. Asmbly is easily accomplished with a ammer or press, and the pin lends itlf to hopper feeding in mechanized sembly operations.

Pin material is cold rolled steel; varius finishes are available; standard zes range from 1/32 to ½-inch. Sevral different pin designs are produced r various applications. Groov-Pin can reused several times.

The Rollpin is a slotted tube of heat eated steel, chamfered at both ends ease insertion into a hole that is ghtly smaller in diameter than the n itself. Resulting compression springads the pin, locking it tight against bration and shock.

Standard Rollpin diameters range om 1/16 to ½-inch; materials include rbon steel, stainless steel, and beryllium copper. The pin is lighter than a solid pin of equal size. If additional shear strength is needed a smaller Rollpin can be driven into a larger one. Rollpins can be reused.

Spirol is a versatile device consisting simply of spiral wound strip of heat treated steel, its cross section resembling that of a jellyroll. When driven into a slightly undersized hole, Spirol becomes spring loaded along its full length; stoutly resists vibration and shock. Shear strength and holding strength can be varied by using different thickness of strip and number of coils. Thus, there are heavy, medium and light duty Spirols.

Material is carbon steel or stainless; several corrosion resistant finishes are available; sizes run from 1/16 to ½-inch diameter, while miniature Spirols are from 1/32 to .052-inch diameter.

Retaining Rings

There are two main types of retaining rings—stamped, and formed-wire. Both are spring-loaded fasteners; both are available in different designs for either internal or external use; and both are usually seated in grooves (some stamped rings do not require grooves, however). Also, both types usually serve as removable shoulders to retain or locate components on shafts or inside bores or housings.

Stamped retaining rings can be produced in many different shapes for diverse applications (see case history on page 82), and usually have holes in the lugs so that they can be quickly installed with special retaining ring pliers. Sometimes they are slightly bowed to compensate for over-wide grooves in the assembly.

Some stamped rings have internal or external prongs that deflect during installation to grip the bore or shaft. Stamped rings can be had in 7075-T6 aluminum, but carbon or stainless steel are standard materials. Manufacturers include: Industrial Retaining Ring Co., Irvington 11, N.J.; Waldes Kohinoor, Inc., Long Island City 1, N.Y.; and Ramsey Corp., St. Louis 66, Mo.

Since formed-wire rings are shaped and cut from spring wire, the grain flow is always perpendicular to stresses that tend to cause permanent deformation. Also, uniform shape of wire distributes loads evenly throughout the shoulder of the groove. Manufacturer: Reliance Division, Eaton Mfg. Co., Massillon, Ohio.

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News Products and People

Long Shingles Cover Roofs Faster, Add New Look

Aluminum shingles 10 feet long and 12 inches wide are a new product of Consolidated General Products, Inc., Houston, Texas. The interlocking sections give a distinctly new look to residential roofs. A complete line of aluminum roofing accessories for the home is also being brought out by Consolidated.

The contour design of the Consolidated shingles allows the body of each shingle to rest against the roof sheathing, giving added support. They will be sold under the name, Regent.

As part of a concentrated quality control program, Consolidated has been studying actual use conditions in pilot installations in California. This is in addition to extensive laboratory, jobsite and research tests.

Consolidated is producing its own aluminum alloy strip through complete, continuous casting facilities. The new shingles are available in six baked enamel colors. They are treated before painting with Alodine 1200 S, made by Amchem Products Inc., Ambler, Pa. Also, surfaces are of wood grain striated design having a wood shingle roof appearance with a deep shadow line.

The shingles are guaranteed for the life of the home. They will not rus rot, split, curl or warp. Elimination roofing repairs and maintenance, r duced insurance rates, and lower hea ing and air conditioning costs, are son of the economies listed by Consolidate for Regent shingles.

The manufacturer claims that, addition to lower labor costs throug quicker easier installations with the foot long shingles and "Lock Line" d sign, there is less material waste th other types of roofing. Each Rege shingle interlocks with each other for sound-proof, weatherproof, permane roof.

The Regent roof is four to sev times lighter than asphalt roofing a ten to sixteen times lighter than bu up roofing. In addition to being lig and easy to handle, the Regent shing require nothing more than a hamm and nails for installation. Also, alu num reflects up to 95% of the sun's h away from the building making it to 15 per cent cooler inside. The b thickness or shadow line on each Rege shingle is a full ⅝". This assures ma mum security and neatness without ga or bad fitting shingles.

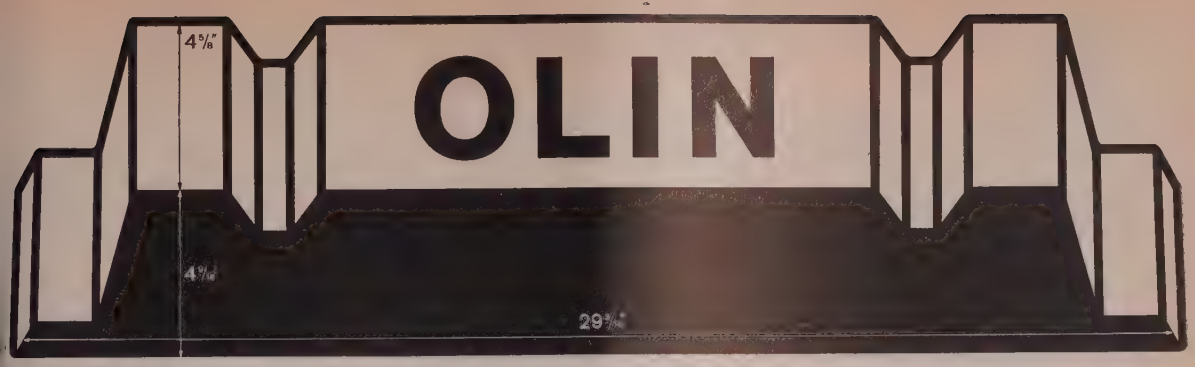
Alkaline Aluminum Etchant Is Fast, Prevents Scale

An aluminum etchant called Diversey D-Etch is highly alkaline for fast etching and formulated to prevent scale, says The Diversey Corp., 1820 W. Roscoe St., Chicago 13, Ill.

The etchant is a white, uniform and free-flowing compound, and is readily soluble in water. It is used in concentrations of 4 to 8 ounces per gallon.

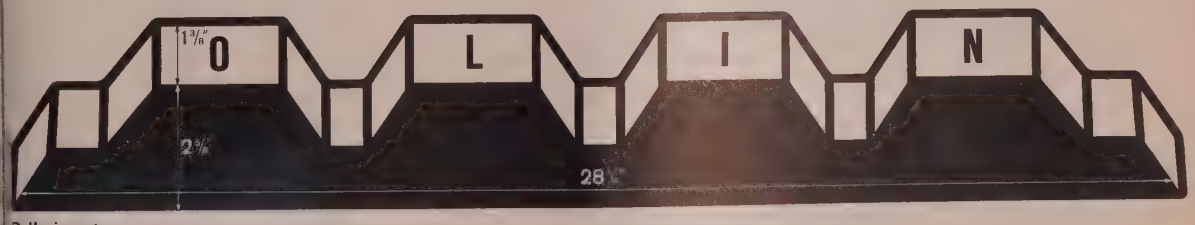
According to Diversey, D-Etch produces uniformly etched surfaces t have a much finer grain than can obtained with straight caustic materi and the resulting satin finish is wid used for decorating purposes.

The new etchant contains special c lating agents to prevent sludge a scale from aluminum oxide and h water salts, Diversey reports. This el inates descaling of tank and coils.



50-lb. ingot

5-lb. ingot



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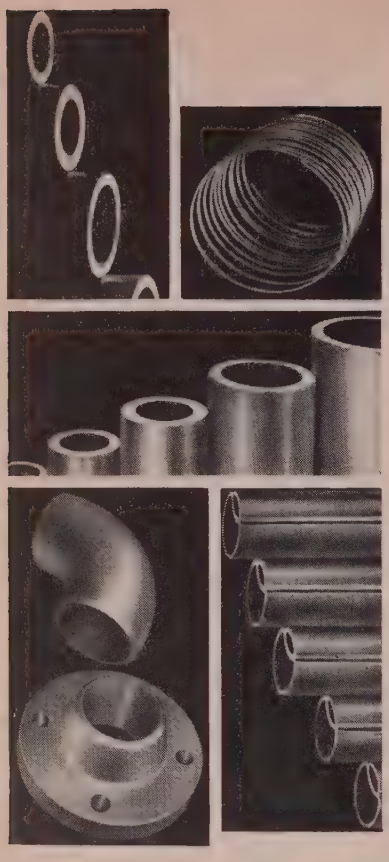

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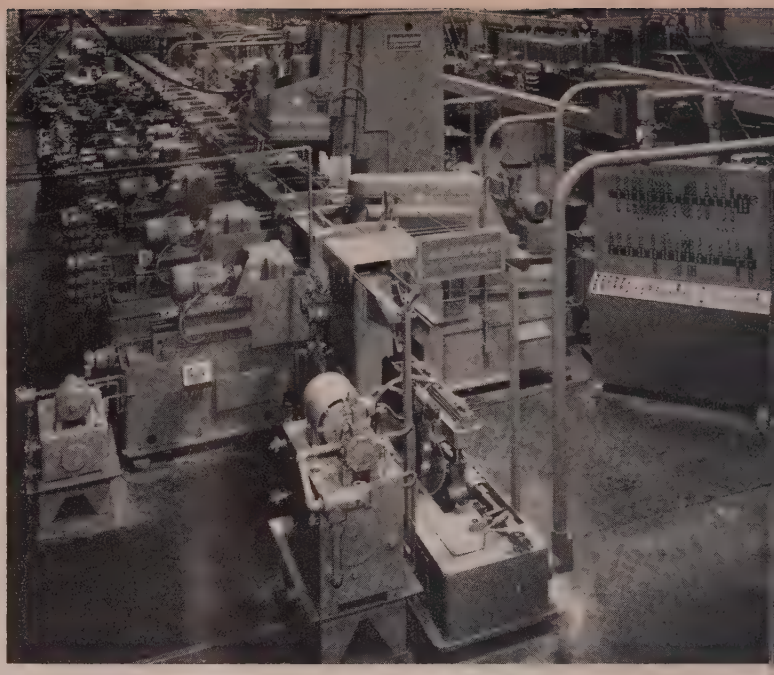

Unit Machines 180 Aluminum Transmission Cases an Ho

A new in-line, part-through transfer machine, designed to machine aluminum transmission cases at the rate of 180 pieces per hour, has recently been installed at Detroit Transmission Division, General Motors Corp.

The machine, produced by Buhr Machine Tool Co., Ann Arbor, Mich., is 164 feet long, 24 feet wide, and has a total of 67 stations.

In all, there are 120 drilling, milling, reaming, spot-facing, chamfering and tapping operations, two automatic assembly operations and a staking operation.

In the first assembly operation, a bushing is automatically pressed into place in the center of the transmission case. The second assembly operation occurs at the end of the machine involves insertion of a shallow rec gular aluminum cup which in a ceeding operation is staked into pl The work cycle is 20 seconds.

Work pieces are positioned clamped automatically and the mach has automatic lubrication. Drill h are mist lubricated.

Other details: The hydraulic sy includes 29 pumps and the same n ber of tanks and filters; the hydr tank capacity is 1080 gallons and it a 412 gallon-per-minute capacity; t are 148 hydraulic cylinders with compensated flow control valves; control panel is 82 feet long, we over 8 tons, and has 310 neon indic lamps and 69 control buttons.

Strip Production By Metal Powder Method Studied

If a continuing program at Stevens Institute of Technology develops into a commercially feasible process, production of sheet and strip from metal powder will be common, according to Gregory J. Comstock, director of the Hoboken, N. J., school's Metal Powder Laboratory.

Pointing out that his laboratory's continuous metal powder strip and sheet process is presently in a preliminary development phase, Comstock said that the potential economics of the process are apparent to those familiar with normal methods of continuous casting, forging, rolling, annealing, etc.

"No data are available as to the actual savings based on the process," Comstock said. "There are, however, certain obvious inherent advantages incident to it even in this incep period which may be used as a stick in making gross estimates o potential savings."

Comstock said it is proposed to cast continuously at room temper relatively thin low density strip sheet, beginning with thicknesses o order of five to sixty mils. Depen upon the metal or alloy sheet. cu ly produced by conventional met from ten to 15 expensive interme operations have been eliminated b new process.

"Obviously, the new developme thin, semi-plastic strips and shee metal powder represent an econo ly better starting point than the ingots and blooms employed by c methods," Comstock said.

itimat Production To Halt or Inspection, Repair

Aluminum Co. of Canada will halt oduction at its plant at Kitimat, Brit- Columbia, in June to permit inspec- n of the water tunnel supplying wer for the smelter. N. S. Crerar, can vice president in charge of power erations, believes that a repair job ll probably follow.

"For some months we have been con- cting tests to determine the cause of unexpected drop in water pressure the tunnel supplying the Kemano droelectric station," Crerar said. hese tests have been completed and dicate to company experts that an in- ection of the tunnel should be made d any necessary repairs carried out."

The company expects that the power- use and smelter will be out of opera- n for five to eight weeks. Crerar said at some 2000 employes will be affected. can's metal inventories, however, will rmit uninterrupted deliveries to cus- ners.

When the tunnel has been drained, can officials expect to find a serious struction in the tunnel, caused by len rock. The repair bill is likely to "of the order of $1 million."

lagnesium Beer Case landrels Last Longer

Beer carton manufacturers are finding at mandrels made out of magnesium e a decided improvement over the old ywood forms which were prone to lintering and had a relatively limited e. The magnesium mandrels are all it indestructible and, because of their ghter weight, easier to handle.

The mandrels, made by Modern Light etals, Inc., Coloma, Mich., are welded Z31B-O magnesium sheet. Ends and ottoms are cold formed from one piece 90-inch thick, while the sides and in- rnal stiffeners are sheet .063-inch thick. ote in the accompanying photo the nter V-shaped space, achieved with an Z31B extrusion, by which the case vers are formed.

Since most of this work is done by omen the lightweight magnesium is n advantageous mandrel material.

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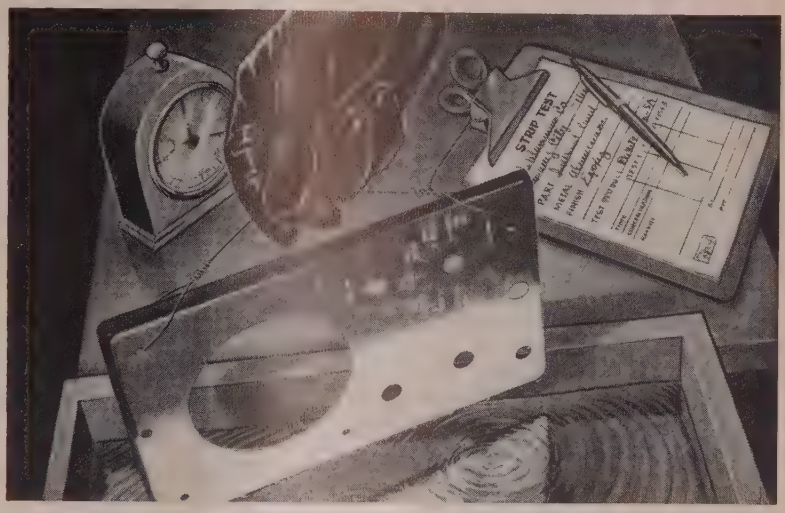

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NEWS FROM

LOMA

After an initial "breaking-in" period, this large LOMA slab casting and sawing installation is now in full production at the aluminum sheet rolling mill of the Quaker State Metals Company, Lancaster, Pa., a division of Howe Sound Company. Capable of producing six 7½ in. x 52 in. x 144 in. aluminum alloy slabs simultaneously, the LOMA semi-continuous casting machine turns out all the ingots required for the processing of sheet, strip and coil. From a quality point of view these continuously cast slabs are greatly superior to those formerly cast in conventional book molds, particularly since one of the methods by which the grain size of the cast material can be controlled is by regulating the casting speed.

For subdividing and trimming the 12 ft. long sheet ingots, Quaker State has also installed a LOMA high-speed circular saw capable of cutting through a 12 in. x 52 in. aluminum alloy section in about one minute. The sawing machine is of the overhead sliding carriage design and employs a 48 in. diameter blade cutting at a speed of 6000 ft. per min. The sawing installation includes a slab charging conveyor, an automatic length stop, a slab discharge conveyor and a chip removal unit. This fully mechanized stock handling equipment combined with the extremely fast feed movement of the saw allows a single operator to run the entire installation at a very high production rate.

LOMA
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Panels Preserve Patio, Poolside Privacy

Louvered aluminum panels with a white baked enamel finish to blend with the design of any home, and that are easily installed, provide low cost patio or swimming pool privacy without sacrificing ventilation or looks.

Nichols Wire & Aluminum Co., Davenport, Iowa, distributes the novel privacy panels. The high-strength aluminum alloy panels come complete with hardware for mounting to standard wood fence posts.

The aluminum panels may also b used to screen off undesirable view such as garbage cans, butane gas storag tanks or alleys. In any application, th specially designed louvers permit th passage of air, but assure privac

Nichols' privacy panels are availab in 4, 5, and 6-foot heights all in 6-fo lengths. They are post mounted so th panels are slightly above the groun

Smelter Will Salvage Magnesium from Bombs

Nine million government surplus magnesium incendiary bombs acquired by Aluminum & Magnesium Inc., Sandusky, Ohio, will be dismantled and remelted into ingot. The smelting firm has purchased the government-owned magnesium reduction plant at Luckey, Ohio and formed a subsidiary company, Luckey Industries, Inc., to run it.

Officials of Aluminum & Magnesium Inc. will be the top officers of the new subsidiary. J. G. G. Frost will be chairman of the board; D. H. Warner, Pr ident; H. J. Williams, vice presider A. J. Vaith, secretary, and A. H. Fish treasurer.

Aluminum & Magnesium's new acq sition is nine buildings with a to floor area of 200,000 square feet, and acres. The salvage work is expected begin within three months and will l about three years. Future operations Luckey Industries will depend up market conditions.

Automatic Lines Inspect Aluminum, Tinplate Coils

Two new automatic inspection and sorting lines for aluminum and tinplate have been installed at the Baltimore, Md., plant of Crown and Closure Div'n of Crown Cork and Seal Co. The line replaces a manual inspection system.

Electronically controlled units examine the coils. As the web is unwound, it goes through a leveler and then a thickness gauge. If the gauge detects a section of the web either over or under standard, it electrically notifies a memory device which causes the subsequently formed sheet to be directed to a reject piler. The sheets are thus checked for thickness before they are cut.

Once past the thickness gauge, t strip passes a visual inspection stati with mirrors over and under the tra ing strip. Beyond the mirrors is an au matic inspection station where the w is checked for pinholes. A light abo the sheet notifies the memory dev if the beam shines through, and t subsequently sheared sheet is reject

The strip is next cut by an adjusta reciprocating shear. An elevated t just beyond the shear enables the ope tor to take any given sheet out of t line to examine it without blocking t whole classifying process. He mer pushes a button to deflect a sheet in

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This new Dow plant produces aluminum coil and flat sheet, in alloys 1100, 3003, 5005, 5050, 5052, 5357, 5457, 5557. Typical commodity items are residential siding sheet, lamp base stock, weatherstrip, fin stock, and building sheet.

Send for Dow's new Aluminum Mill Products data book. You'll find important details on alloys, sheet sizes and facilities. Write for a copy today. The Dow Metal Products Company, Midland, Michigan, Merchandising Dept. 1106CQ5.

THE DOW METAL PRODUCTS COMPANY

Division of The Dow Chemical Company

the tray. From the shear the sheets move to the piling sections.

The pilers may be used interchangeably and were especially engineered for this operation by The Dexter Co. Div. of Miehle-Goss-Dexter, Inc., Pearl River, N.Y. Two pilers are used, one for good sheets and one for rejects, the third piler waits for a new load. Automatic counters total up the good and bad sheets.

Each piler includes an elevator platform which indexes downward as it collects sheets on a skid. When fully loaded, the skid is rolled off the platform onto a stand-by conveyor.

Reynolds Buys Old Plant

A 650,000-square-foot plant in Chester, Pa., once used by Ford Motor Co. for assembly operations has been acquired by Reynolds Metals Co. Reynolds paid $2,200,000 for the property and will use it to manufacture insulated wire and cable products.

Three months ago Reynolds announced purchase of the insulated wire and cable manufacturing equipment of the John A. Roebling & Sons Div'n of Colorado Fuel & Iron Corp. It will doubtless go into the Chester plant to enable Reynolds to increase its activity in the electrical conductor market.

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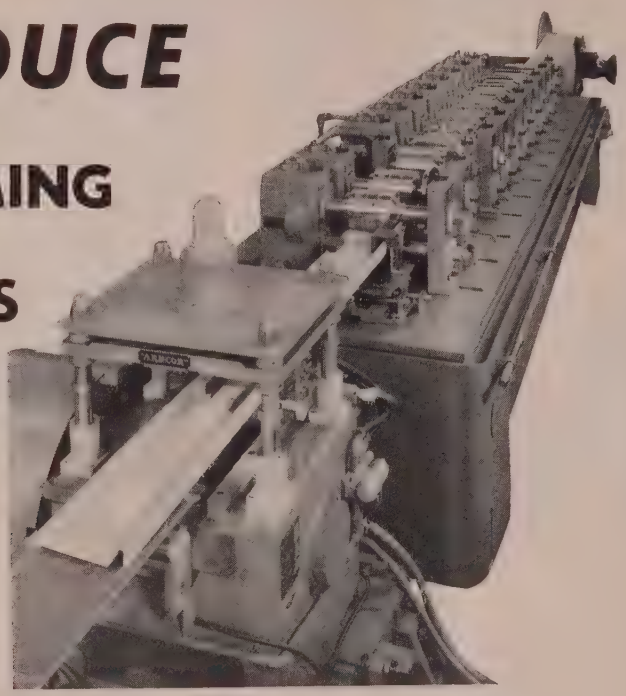

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Lamp Manufacturer Likes Aluminum

A new line of gas lamps for trave trailers and hunting lodges has bee introduced by Humphrey Produc Div'n of General Gas Light Co., Kal mazoo, Mich. Like an older line, th new Series 4 lamps (pictured) are mad primarily of aluminum.

In addition to the body and glob holder shells, the unit's bunsen castin is also aluminum, adopted, the manu facturer reports, because the metal "ideal for drawing the various boc shells." The castings are easy and fa to machine, the division reported.

"Using aluminum enables us to offe a product which is rust-resistant an can be offered in a choice of sever anodized colors," the company sai "These, combined with the fact that shi ping weight is reduced on the finishe goods, are some of the reasons we hav chosen aluminum."

Filmless Compound Cleans Aluminum Prior to Etching

Introduction of Aldet, a silicate-fre soak cleaning, companion-product f Wyandotte Mil-Etch is announced l Wyandotte Chemicals' J. B. Ford Div Wyandotte, Michigan.

Aldet is recommended for cleanin buffed aluminum prior to bright di ping, etching, anodizing, conversio coating, porcelain enameling, spot wel ing. It is also recommended for clea ing galvanized iron, steel, and terr plate where a mild, highly buffere cleaning product is required.

According to the manufacturer, Alde leaves no residual films to interfere wi subsequent processing, will not du brightly buffed aluminum. When us for cleaning weathered aluminum, Alde is said to eliminate pitting or streakin

Aldet was developed as a "perfe pre-cleaner for Wyandotte Mil-Etch, non-scaling, alkaline compound for di orative and deep etching (chemical m ing). Mil-Etch is said to give all a minum alloys a fine, uniform satin- pearing etch, also eliminates scale a sludge problems.

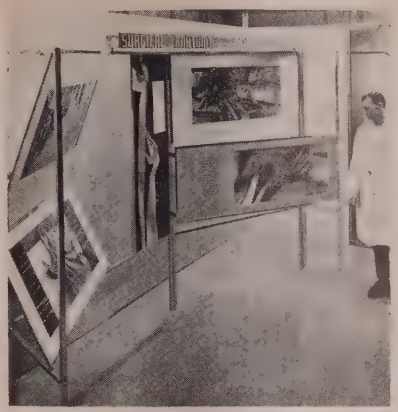
uminum Extrusions Frame Educational Visual Aids

luminum has for years been a de- ble construction material for display aratus, notably picture frames, dis- y boards and light boxes. The rea- s, of course, are the material's bright, dern look, its lightness and its work- ity.

luminum is used to good advantage the Medical Teaching Aids section he Medical School of the University California at Los Angeles. Frank melbaugh, in charge of the section, ided a long time ago that wood was heavy, too costly to fabricate and p, and too demanding of time when nponents of a display unit had to be embled. There was often a lengthy t during construction for glue or nt drying.

Humelbaugh first studied the possi- ities of aluminum extrusions for this rk, but roll formed aluminum proved expensive and lighter in weight. isting him in the efficient applica- n of roll formed shapes was the en- eering staff of Universal Molding .. Lynwood, Calif. He creates his plays from Universal's stock items, luding 1 x 1-inch screen frame, round H square tubing, storm-sash frames l angles and channels.

All work is done by Humelbaugh and



one assistant, using a few simple hand tools and a radial saw. Although no two displays are the same, standardization of design and construction is the goal to ease shipping problems. Most displays are limited to seven feet in height. The largest linear display area yet produced from roll formed tubing in a single exhibit was over 120 feet long; yet its framework upon disassembly requires less than 10 cubic feet of packing space.

With displays specifically in mind, Universal Molding Co. has now introduced Unicolor roll formed shapes in eight different colors.

Claim Delrin Lock Nuts Have Metal-Like Properties

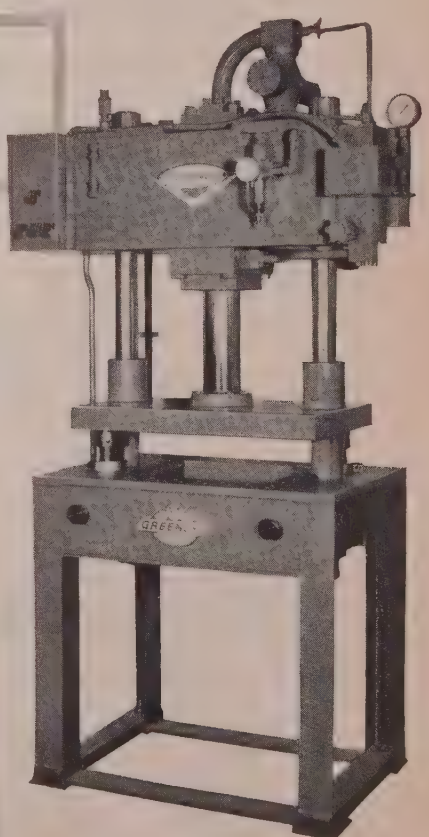
Open-end acorn lock nuts are being made from Delrin by Russell, Burdsall & Ward Bolt & Nut Co., 100 Midland Ave., Port Chester, N. Y., for use in manufacturing lawn furniture, toys, aluminum tubing products and similar light duty items where corrosion resistance and reusable locking action are needed.

Price of Delrin nuts is about one-half that of aluminum. And the prevailing torque Delrin nuts are claimed to offer metal-like mechanical properties — strength, rigidity, dimensional stability and resistance to water and organics.

No. 10 and ¼-inch sizes are available. Since the nut forms its own thread as it is assembled, the No. 10 size fits both 10-24 and 10-32 threads, and the ¼-inch size fits both the ¼-20 and ¼-28 threads. Nuts come in metallic gray and gold, and off white.

The No. 10 nuts have a holding strength of 500-600 pounds under straight tension; prevailing torque is 8-10 inch-pounds; stripping torque is more than 20 inch-pounds. For the ¼-inch size holding strength is 600-700 pounds; prevailing torque is 10-14 inch-pounds; stripping torque 25-30 inch-pounds.

NEW GREENLEE-B&T 2-BAR HYDRAULIC TRIM PRESS



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Prices Slashed 12% to 15% On Beryllium Metal Powders

Substantial reduction in prices of pure beryllium metal powders was announced recently by Brush Beryllium Co., 5209 Euclid Ave., Cleveland 3.

Price of Brush virgin powder (100 series) has been reduced about 12% while the more widely used blend powder (200 series) has been dropped over 15%, from $71.00 to $62.50 and $64.00 to $54.00 per pound respectively, for 20,000 pound base lots.

According to N. W. Bass, vice president-sales, savings inherent in larger volume production are being passed on to customers as expanded capacity goes "on stream." He refers to a $6-million expansion of Brush's Elmore, Ohio, refinery which is nearing completion.

Additional furnace capacity, chemical processing equipment and support facilities will more than double pure beryllium metal capacity, upping it from 12,000 pounds to more than 30,000 pounds monthly. Brush is also expanding its Cleveland beryllium metal fabrication and machining facilities.

ALUMINUM BOILER MECHANICAL AND STAINLESS

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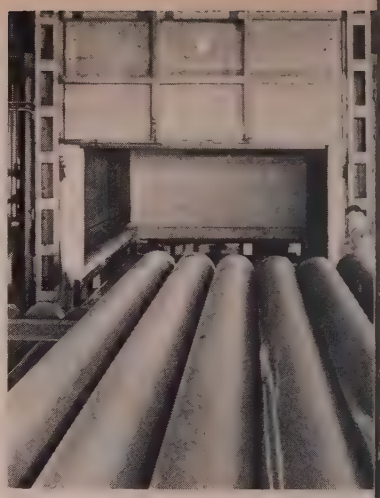

Homogenizing Oven Reduce Extrusion Tear Marks

Less tear marks in extruded alum num results if logs are first homogenize

Shown above is the homogenizi oven built by Despatch Oven Co., Mi neapolis, Minn., for Wolverine Tul Division, Calumet & Hecla Corp., Dec tur, Ala.

Rated at 1150° F maximum, the ov is gas-fired, uses radiant tubes a achieves ±10° F control. Fast recove time has enabled firm to boost outp over previous installations, and te marks have been minimized, claim co pany officials.

New Casting Alloy Has High Strength Feature

Tens-50 is the name of a new all from which castings can be produc with tensile strengths up to 50,000 p It is a Reynolds Metals Co. product.

The new alloy was developed for u in critically loaded aircraft and miss structures by the Los Angeles Divisi of North American Aviation. It may used for any application demandi high-strength performance along wi low weight.

Reynolds has been licensed by Nor American's marketing subsidiary, Nav Products, to manufacture and sell t alloy. It will be produced at Reynol plant at Jones Mills, Ark.

Tens-50 castings have the followi typical mechanical properties. Sa castings: tensile strength of 47,000 p yield strength of 38,000 psi and elongation of four per cent. Permane molds: tensile strength of 53,000 p yield strength of 43,000 psi and elongation of seven per cent.

The alloy may be cast in both sa and permanent molds without the ne for special tooling or extra procedur Because of its high fluidity, wall thi nesses of ⅛ inch may be cast in sa and 5/32 inch in permanent molds. T

ciple alloying elements are silicon magnesium with small additions of llium.

ynolds Adds Two trusion Presses in West

wo aluminum extrusion presses are ıg installed at Reynolds Metals Co's. rance, Calif. facilities at 2315 Domıez St. The 1500-ton units were supd by the Watson-Stillman Press 'n, 565 Blossom Rd., Rochester, N.Y. he new presses are expected to be- operation in mid-May and will ıire employment of about 30 per-. Charles Hudgins will be in charge he new facilities with William Kazel- assisting him.

rrugated Sheet Aids sulated Truck Building

Aluminum sheet is used in the conıction of a new insulated trailer de by C. L. Whitaker & Co. Ltd., imsby, England.

The trailer is designed for conveying ishables preserved either by dry ice by continuous temperature control. th either method the controlling air st circulate freely around the load it cannot be placed flush against nicle sides.

In the past separate strips of beadg were fitted at regular intervals ide the trailer. But the lining of the w trailer has been constructed from rugated aluminum sheeting made by can Industries Limited, Banbury, g. This sheet has a ridge at regular ervals and thus provides both a ing sheet and beading.

The floor of the vehicle is formed m 3/16-inch aluminum treadplate welded in place to prevent moisture m penetrating the insulating material der the floor.

The trailer is 26 feet long, 7 feet 8 hes wide and 7 feet 6 inches high. outer skin is of aluminum sheet, d insulation is foamed polystyrene 5 hes thick in the sides and 6 inches ick in the roof and floor. Trailers are nstructed so refrigeration units can fitted on the front bulkhead.

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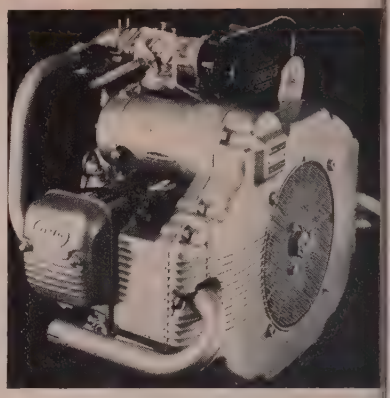
Die-Cast Aluminum Engine For Farm, Auto, Other Uses

An 18-hp. 2-cylinder, 4-cycle die-cast aluminum engine that is air-cooled is being readied for June deliveries by the OMC Engines & Equipment Div. of Outboard Marine Corp., Waukegan, Ill.

The engine is designed for heavy duty applications such as powering farm, welding and auxiliary lighting equipment, and for automotive, and similar applications.

The unit has a full pressure lubrication system, overhead valves, an alternator, a cylinder head integral with the cylinder, an alloy steel crankshaft, steel-backed babbitt main and rod bearing inserts, and a re-usable polyurethane element air cleaner.

OMC says the engine can be modified for particular customer applications. This includes altering the mounting,



drive, and fuel operating features. Ex ample: The engine can be made to ru on LP gas, kerosene or natural gas a well as gasoline.

Metals Firms Offered Plant, Equipment Sale-Leaseback Pla

A new plan, by which metals manufacturers and fabricators can sell their existing plant and equipment and immediately lease it back for terms of from three to 12 years, has been announced by Nationwide Leasing Company, 11 S. La Salle St., Chicago 3.

According to Robert Sheridan, president, the Nationwide Sale-Leaseback plan was designed specifically for firms which have an excessive investment in fixed assets and whose growth, as a result, is being hampered by tight working capital.

He adds that selected metals firms can sell, for cash, fully or partially depreciated equipment to Nationwide at greater-than-book-value and lease it back. This is the first such plan ever developed for the metals industry, he says.

Use of the sale-leaseback is expanding rapidly, claims Sheridan. In 1960 sale-leasebacks of plant and equipment totalled $340 million, of which equipment accounted for $57 million.

Every type of production and offic equipment is included in the leaseba plan. According to the plan, equipmer will be purchased by Nationwide, fo cash, at book value and for selecte firms at even higher prices. The equi ment will be immediately leased bac to the companies for terms from thr to 12 years, depending on the type equipment, without a security depos

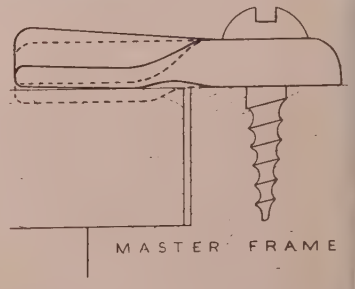
Equal quarterly payments will b made unless other schedules are r quested; custom built equipment is i cluded in the plan. Minimum amou that will be considered is $25,000 b there is no maximum.

To qualify for a Nationwide Sal Leaseback, a company must: Have net worth of at least three times t sum involved, with a minimum n worth of $100,000; a history of profitab operations; submit an appraisal of t current value of the equipment i volved; show evidence of a compete management group.

Nylon Clips Prevent Screens From Rattling

A molded nylon clip holds window screens or storm window panels in place in convertible window frames, says Gries Reproducer Corp., New Rochelle, N.Y. Nylon's high elasticity permits the clip to "give" under tension, but still exert the pressure needed to hold the screen firmly in place.

In use, a No. 6 screw holds the "heel" of the clip to the master window frame. As the clip is swung into place, the free end bends outward slightly (shown by broken line above), thus exerting a spring pressure on the inserted panel. The nylon clip is weather resistant and



causes no electrolytic corrosion proble when in intimate contact with an al minum window frame. The clip me ures ⅞ by ½ by ⅛-inch.

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Malayan Rolling Mill To Be Built by Alcan

Malaya's first aluminum rolling mill will be built by a newly formed company called Alcan Malayan Co. Ltd. The mill will produce aluminum sheet, circles and building sheet.

Initially, the subsidiary will be wholly-owned by Aluminium Ltd. which will finance the enterprise and provide technological know-how. Malay personnel will operate the plant and a Malayan managerial staff will be trained.

Construction is expected to start immediately at Petaling Jaya, near Kuala Lumpur. Estimated cost of the project is $1,300,000. The mill will have an annual capacity of 2000 tons, and will use ingot imported from Canada.

Production from the mill will provide local aluminum manufacturers in Malaya and Singapore with rolled products for further fabrication and uses. There is an established Malayan market for aluminum sheet for rubber estate equipment, building products and transportation applications. And corrugated aluminum building sheet is much in demand for housing in Malaya.

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Financial Briefs

Alside, Inc. Reports Record First Half Sales, Earnings

Alside, Inc., Akron, Ohio, large manufacturer and distributor of aluminum siding and accessories, had the highest first half sales and income in its history during the six months ended March 31, 1961, according to Jerome J. Kaufman, president. Sales totaled $9,019,683 as compared with $8,649,581 for the corresponding period of 1960. Profits after taxes amounted to $653,458, an increase of about 37.5% over after-tax earnings of $475,296 for the first six months of the 1960 fiscal year. Net income per share of capital stock, based on 1,864,480 shares currently outstanding, was 35 cents in the first half of fiscal 1961, as compared with 25 cents in the corresponding period a year earlier. Kaufman attributed the increase to intensified sales efforts and greater manufacturing efficiency.

Aluminium Sees Better Year At Home Than Abroad

Although Aluminium Limited had an estimated net income of $7.5 million in the first quarter of 1961 compared with $8.8 million for the same period last year, net earnings were only slightly different after allowing for certain non-recurring benefits. The company reported that its total sales decreased in the first quarter about 10% compared to last year, while fabricated product sales remained about the same. First quarter bookings lead Aluminium's president Nathanael Davis to believe that overseas sales will decline somewhat, while U.S. and Canadian sales will increase.

Apex Earnings Off in '61

Apex Smelting Co., Chicago, reported net earnings of $235,323 for the first quarter of 1961, compared with $268,981 in same 1960 period. These earnings were equal to $1.15 per share for the 1961 first quarter as compared to $1.3 a year ago on 203,851 shares outstanding.

Bohn Aluminum Sees Recovery Signs

Bohn Aluminum & Brass Corp., diversified aluminum fabricator in Detroit, had net sales of $10,412,040 in the first quarter of 1961. However, operating profits before taxes of $196,7 were more than offset by non-recurring losses of approximately $297,000 resulting from sale of the real property and relocation of the company's Detroit foundry. Result was a net loss for the quarter of about $49,193, equal to cents a common share. S. D. Den U

hn's board chairman, said that the n's broad diversification has helped hion the business recession; now re are signs of recovery, he said. tos, heating and air conditioning and nstruction look good for Bohn this ır.

in Mathieson Aluminum perations Show a Profit

Thomas S. Nichols, chairman of the ard of Olin Mathieson Chemical rp., reported that the company's uminum operations were profitable roughout the first quarter of 1961 and re expected to continue showing a ofit throughout the year. Olin's first arter sales generally were found to short of the company's record oper- ons in the first quarter of 1960, or 59,959,000 this year compared to 61,132,000 in the first quarter last ar. Net profits amounted to $5,115,000 mpared to $8,567,000 a year ago.

epublic Foil arting to Move

First quarter net sales of $1,415,000 d net profit of $64,894 after taxes were ported by John W. Douglas, president Republic Foil, Inc., Danbury, Conn. e pointed out that net profit, while % below the first quarter of last ar, was about three times greater than e combined earnings of the last nine nths of 1960 due to a marked im- rovement in demand for plain foil oduced in Danbury and etched foil oduced in Salisbury, N. C.

evere Sales, Net own from 1960

Net income of Revere Copper & ass Inc. for the first quarter of 1961 talled $1,907,124, equal to 71 cents r share on the 2,684,560 shares of mmon stock outstanding. For the mparable period in 1960 net income as $2,196,116, or 82 cents a share, the 2,676,125 shares then outstand- g. Revere's sales for this first 1961 arter totalled $50,476,086 as com- red with $56,807,126 for the same riod of 1960, a decrease of 11.2%. An crease in demand for Revere products March "presages a somewhat higher vel of business," the company said.

eynolds First Quarter les Up, But Profits Down

Reynolds Metals Co. had sales of 08,949,000 in the first quarter of 61, up from $106,615,000 reported in e first quarter of 1960. Net income for e 1961 quarter was $5,271,000, equiva- nt to 25 cents a share on the 17,040,- 5 common shares outstanding. Net in- me for the same period last year as $6,050,000, equivalent to 30 cents the same number of shares.

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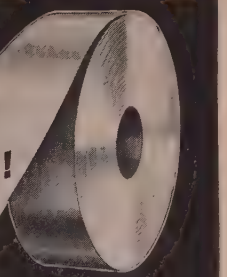

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ooking Ahead

rent contradictions sprouted in the aluminum industry as the sluggish spring upturn brought a slim ray of hope for brighter days ahead. While aluminum output limped along at about 72% of industry capacity, and faltering demand in Europe stalled the important export business, at least two outsiders warmed up to the idea of entering the primary end of the business. As producers' inventories remained at near-record levels, Kaiser and Anaconda planned to reactivate idle potlines, while Harvey and Ormet kept their smelters running full blast. One producer aimed a jab at "commodity pricing" just a few weeks after shaving another 5% off the price of electrical conduit. And to compound the industry's problems, secondary smelters chopped a cent a pound off the price of ingot, and the Justice Department slapped anti-merger suits on Alcoa and Kaiser.

ffening government attitude toward industrial concentration was apparent in the suits filed against Alcoa and Kaiser. Other industries will watch with more than passing interest to see if the Justice Department succeeds in its efforts to stymie the planned Kaiser-Kawneer merger; to snatch Cupples Products Co. out of the Alcoa fold; and to force Kaiser to disgorge the wire and cable business (U. S. Rubber Co.) that it gobbled up four years ago. If the producers decide to fight, spectators will face a long wait for the outcome; these things take years. Example: Justice Department filed suit in April 1960 against Alcoa's acquisition of Rome Cable Corp., but the trial won't get underway until this fall.

r talked tough in reply to the suits; contended that its planned acquisition of Kawneer Co. would not lessen competition in the architectural products field because the two firms had not been competitors in the first place—that, in fact, it would increase competition in this already fiercely competitive business. The suits charged that both this merger and the earlier Alcoa-Cupples arrangement would put the squeeze on smaller outfits in the architectural products field. As for the suit aimed at Kaiser's 1957 deal with U. S. Rubber, Kaiser retorted that it had never been in the insulated conductor field until the merger; that the move was intended to hasten the switch from copper to aluminum in the insulated conductor field. No reaction from Alcoa as of this writing (May 9).

e Justice Department's action succeeds in scaring off Kaiser, it could queer any similar schemes that may now be in the embryonic stage. And if the government succeeds in extracting Cupples Products from Alcoa, that will leave Reynolds Metals sitting pretty with its internally organized architectural products division. Competitors will have to hustle like hell to catch up with the shrewd Reynolds boys in one of aluminum's best growth markets.

Among the prospective new producers, Cerro Corp. looks like the front-runner at present. The big copper-zinc-lead producer recently snapped up United Pacific Aluminum Co., the west coast aluminum fabricator that had earlier taken out options on land near Longview, Wash., with plans to build a 20,000-ton aluminum smelter. United Pacific had also obtained a power allocation from Bonneville Power Authority. At Cerro's annual meeting early this month, president R. P. Koenig revealed tentative plans for a 55,000-ton smelter which would incorporate "certain recent technological improvements . . . contributing to lower capital and production costs." He also announced that Cerro's other aluminum subsidiary, Fairmont Aluminum, will double its sheet rolling capacity to 66 million pounds annually later this year.

Howe Sound Co. is the most recent candidate for the primary producers club. Its Quaker State Metals Division has been going great guns in the aluminum sheet, tube and building products business; actually racked up sales and earnings gains during a first quarter that was bleak, at best, for most of the industry. At a recent speech in Cleveland, Howe Sound's president, William Weaver, casually remarked that the company was considering construction of a one-potline plant in the Pacific Northwest. Initial capacity would be 30,000 tons, but a second potline would be contemplated. Judging from Quaker State's progress these days, they could use the metal. The big hitch is financing; banks are understandably leery of aluminum ventures nowadays.

North American Coal Corp. may jump into the business of making alumina. Its joint program with Strategic Materials Corp. has yielded encouraging results, the big coal producer revealed recently, and an aluminum sulfate plant will be built at Powhatan Point, Ohio. Apparently it will process coal mine waste into aluminum sulfate, which can then be converted to alumina. No mention of a smelter, but there should be a good market for that alumina, if new producers enter the business.

Aircraft landing mats are planned for friendly foreign nations, according to the Washington rumor factory these days. The Army's Corps of Engineers is already at work on the project. Our spy says if the thing goes through it will involve some 87,000 tons of steel or 45,000 tons of aluminum, depending on the metal they choose. Sounds like an awful big project (or rumor), but aluminum people should investigate.

—The Editors

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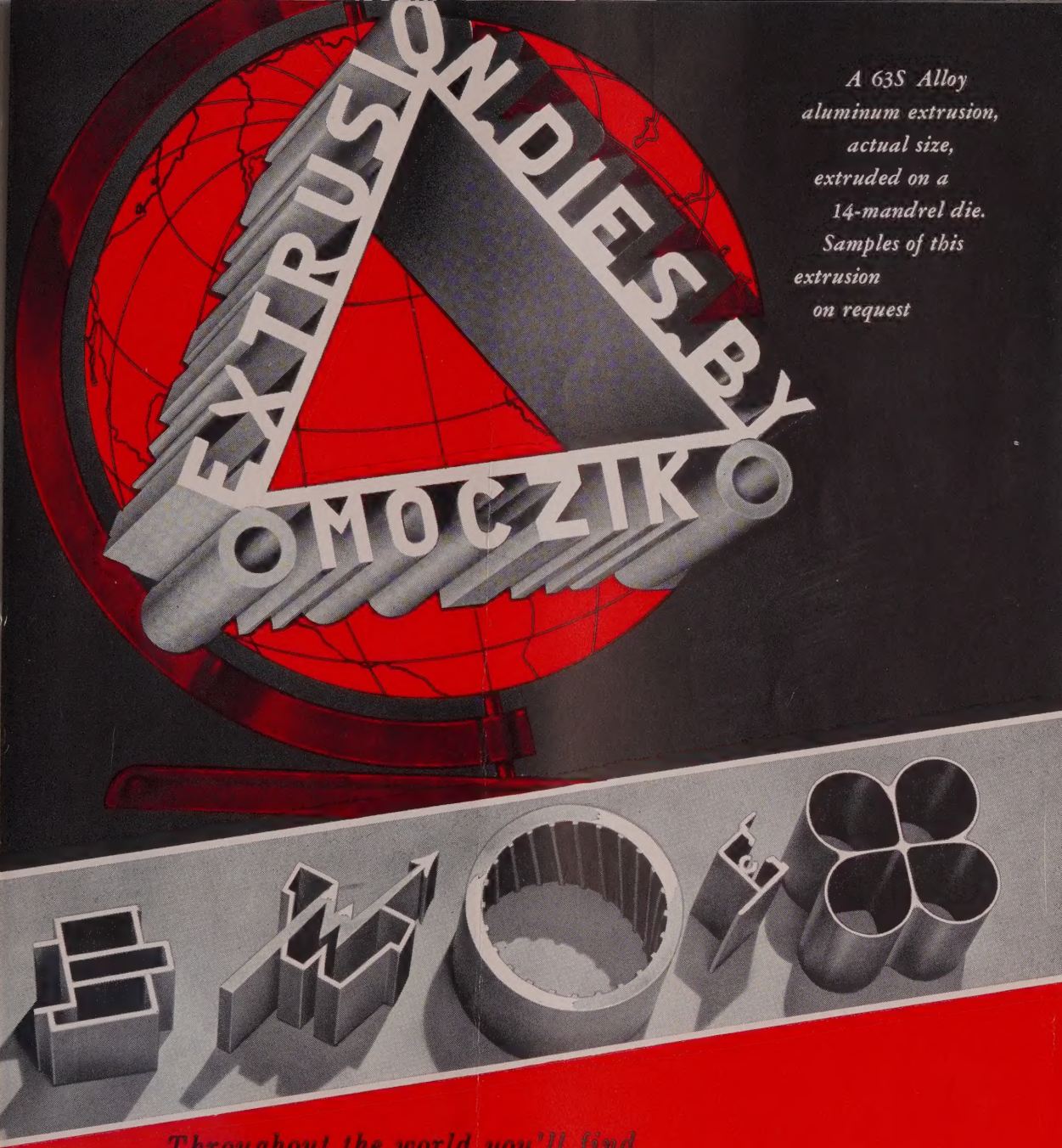

A 63S Alloy aluminum extrusion, actual size, extruded on a 14-mandrel die. Samples of this extrusion on request

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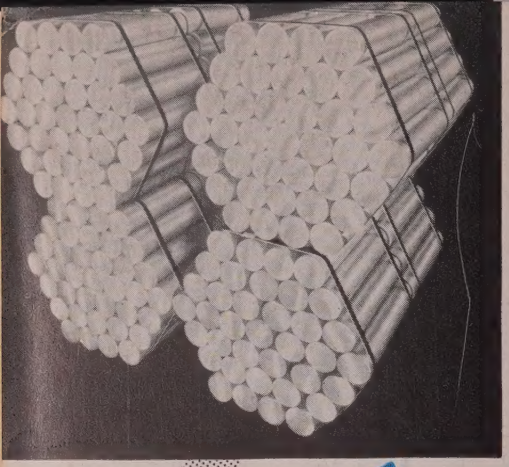

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APEX ALUMINUM EXTRUSION BILLET

Superior workability for economical extrusions—Quality controlled Apex casting delivers a billet with improved internal structure, the most desired metallurgical properties, better surface finish and highest workability.

Standard specs and sizes readily available from stock—Both as-cast and homogenized billet to standard alloy specifications, sizes from 2″ up, stocked and ready for prompt shipment. Standard lengths or longer as desired. We'll produce from customized alloys if you wish. Less order lead time required—fast and flexible service.

Special palletizing to your requirements—Standard shipments are self-palletized and steel bound, with staggered stacking for easy fork truck handling. But *you* name *your* requirements—we'll palletize to meet them.

Apex's unexcelled product quality and purity are assured by **rigid quantometer control, ultrasonic inspection** and the know-how gained in 37 years of research and experience in the metal industry. Write, wire or phone for full, first hand facts on superior Apex billet and service to aluminum extruders.

APEX SMELTING COMPANY

Chicago 12 • Cleveland 5 • Long Beach 10, Cal.
Springfield, Oregon (National Metallurgical Corp.)

Research leadership back of every ingot